Research Review of Prevention and Intervention

Among children and teens, scientific research on prevention and intervention has most studied three drugs: alcohol, tobacco, and marijuana. Cocaine, methamphetamine, opiates, and designer drugs, such as ecstasy, get media coverage and the focus of law enforcement. However, these "harder drugs" are typically less targeted in child and adolescent research, partly because "hard" drugs are seldom initiated without the earlier regular use of tobacco, alcohol, and marijuana. From a state policy planning perspective, *prevention* typically means the use of universal strategies, applied to every child, teenager, or adult.

Interventions are typically used with a much smaller group of children, teens, or adults who have some current behaviors or conditions that elevate the chance that they will develop more serious problems.

United States Research

Substance abuse is not just an urban event; it has permeated rural America. At least two types of profiles have emerged.[15] In published studies, at least two distinct populations of teenagers were identified. The one large group (83%) consists of either abstainers or experimental users. Primary prevention strategies should be addressed to these young people. The other group, multi-problem teens (17%) have a clearly identified lifestyle—certain cultural practices, multiple substance use, frequent sexual activity, and poor grades. These profiles from other areas turn out to mirror Wyoming.

Problems in Early Theory and Science

The study of substance abuse prevention scientifically is relatively new, about 35 years old. Amazingly fine research and practice has developed during that period, such that we presently have very promising constructs and examples of prevention models. That said, prevention research inevitability involves tracking people over time to determine if a prevention effect has happened. The process of data analysis, statistical analyses, and publication add about 3-5 years on top of the longitudinal tracking.

Sometimes these lags are not well understood, as happened when one of the major consultants on this project, Dr. Dennis Embry, was questioned by some high-level law-enforcement people after his large Centers for Disease Control project on youth violence in elementary schools had been running for 3 years. Asked one widely respected but somewhat impatient person, *"How come homicides haven't been reduced in those communities that use your program?"*

The answer was direct but beguilingly simple on the face of it: "Kindergartners don't kill many people, and they still don't when they are in the fourth grade."

In a similar way, Kindergartners don't shoot up drugs, but some of their behaviors do or do not predict substance abuse a decade later.

Advances in Theory and Science

The research on actual attempts to *prevent* substance abuse, as opposed to studying the frequency and characteristics of substance abuse, started just two decades ago. The failures and successes spawned a new generation of research that started to be published in the early and mid-1990s. Additionally, various longitudinal studies, twin studies, and the rapid explosion of neuro-science research in the last 10 years have contributed to a far richer understanding of how effective substance abuse prevention might be undertaken.

Epidemiological Thinking

Epidemiology is a medical word. Its stem comes from epidemic—or how diseases spread rapidly. In many ways, substance abuse has been and is an epidemic—something that spreads rapidly and quickly. That's certainly true in Wyoming and other rural states, where substance abuse rates skyrocketed. The start of the scientific study of the spread of disease began well over 100 years ago.

In 1854, a cholera epidemic was sweeping across Europe. During one outbreak in London, over 500 people died in just ten days. No one knew what caused the epidemic, and there was no cure for the disease. Having a hunch about what the source of the disease might be, Dr. John Snow walked through the City of London to document where each victim had lived. By this method, he discovered that the outbreak was largely restricted to an area within 250 yards of the Broad Street water pump. Snow arranged for the pump to be removed, and within three days, the epidemic ended. Looking for the "center" of the disease can yield to great advances in public health. This has been done in a number of ways in the past 50 years with substance abuse, in several domains. Linkage (also called risk and protective factors) studies developmental and neurological pathways. A bit of information from each of these areas helps frame the Wyoming prevention and intervention strategies.

Linkage Studies. Linkage studies typically look for the "links", which may be environmental (like the pump in London), social (cities rather than towns seemed to have cholera faster, for example), behavioral (say some folks walk to a different pump), or biological—even genetic (like the type of germ or some people may be more vulnerable).

What might be some linkage studies? A basic linkage study for example shows the pattern between smoking and other drugs in young people below, drawn from national analysis. This linkage study suggests that there are some strong relationship between the use of tobacco and other drugs, though the cause is impossible to ascertain from this type of linkage study. Other studies provide the underlying reason why. Figure 24 below shows such a linkage between tobacco use and other problem behaviors.

Other types of linkage studies or models have been conducted or proposed. Some of the linkage models attempt to embrace multiple problems and variables. One of the more well-known is the Risk and Protective Factors model, originally

proposed by Richard Catalano and David Hawkins, which will be shown next.

Figure 21: Tobacco Use and Other Substance Misuse

The Co-Occurrence of Smoking and Other Problem Behaviors
The 1992 National Health Interview Survey of Youth Risk Behavior (NHIS-YRBS), National Center for Health Statistics
N=10,645 persons, age 12 to 21 years

	Problem Behavior	Current Smoking (SE)	Never Smoker (SE)
	Drank Alcohol in Past Month	74.4 (1.11)	23.0 (1.02)
	Five or More drinks in row	50.3 (1.22)	9.5 (.69)
	Used Marijuana in Past Month	26.5 (1.02)	1.5 (.025)
	Smokeless Tobacco in Past Month (boys only)	28.1 (1.76)	4.1 (0.52)
	Carried a Weapon	25.6 (1.12)	9.5 (0.59)
	Physical fight in past year	54.7 (1.09)	29.0 (0.86)
	Ever had sexual intercourse	80.0 (0.99)	41.4 (1.40)

Figure 22: Risk and Protective Factors Checklist

Risk Factors	Adolescent Problem Behaviors				
	Substance Abuse	Delinquency	Teenage Pregnancy	School Dropout	Violence
Community					
Availability of Drugs, Tobacco & Alcohol	X				
Availability of Weapons to Harm People		X			X
Community Laws and Norms Favorable Toward Drug Use, Violence, and Crime	X	X			X
Media Portrayals of Violence					X
Transitions and Mobility	X	X		X	
Low Neighborhood Attachment and Community Organization	X	X			X
Extreme Economic Deprivation	X	X	X	X	X
Family					
Family History of the Problem Behavior	X	X	X	X	
Family Management Problems	X	X	X	X	X
Family Conflict	X	X	X	X	X
Favorable Parental Attitudes Toward and Involvement in the Problem Behavior	X	X			X
School					
Early and Persistent Antisocial Behavior	X	X	X	X	X
Academic Failure Beginning in Elementary School	X	X	X	X	X
Lack of Commitment to School	X	X	X	X	
Individual/Peer					
Rebelliousness	X	X		X	
Friends Who Engage in the Problem Behavior	X	X	X	X	X
Favorable Attitudes Toward the Problem Behavior	X	X	X	X	
Early Initiation of the Problem Behavior	X	X	X	X	X
Constitutional Factors	X	X			X

Source: Howell, J. (Ed.). 1995. Guide for implementing the comprehensive strategy for serious, violent, and chronic juvenile offenders. Washington, DC: Office of Juvenile Justice and Delinquency Prevention, U.S.

Wyoming, like many political jurisdictions, uses and recommends the risk and protective "checklist" to assist in the planning of prevention and intervention programs or services, since there is substantial evidence to support the prediction rate of various risk or protective factors. Subsequent to this checklist idea, scientists have made conceptual advances in "weighting" risk or protective factors in terms of which ones might be more important at different times in predicting multi-problem behaviors. Generally these are called multi-variant studies on prediction, and they offer significant advances for state planning.

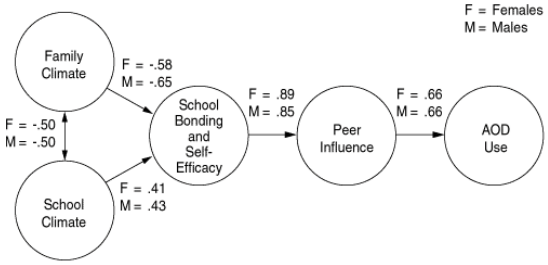
Multi-Variant & Longitudinal Studies

A number of studies have followed the same young people over a period of years. Some of the studies have involved interventions to change their behavior. These studies, because they follow the same children over time, allow for greater precision of understanding of what might be necessary to reduce substance abuse. Several of these studies are very well constructed and highly relevant to issues of substance abuse in Wyoming. One of the noteworthy studies is from Canada.

About 800 six-year-old Canadian boys were followed through age 13 for signs of early onset of substance abuse. Three models were tested to figure out whether individual characteristics and/or peer influences were linked to later substance abuse. Individual characteristics consisted of fighting, hyperactivity, oppositional behaviors, and likeability. Peer influences referred to mutual friends' characteristics (aggressiveness and likeability). Data were collected from teacher ratings, peer ratings, and self-reports. Results were replicated three times, and indicated that individual characteristics—more than friends' deviance—were key to the development of substance abuse. Disruptiveness in kindergarten led to disruptiveness at the end of elementary school, which subsequently led to substance abuse prior to 14 years of age. [Data reported later from Wyoming suggests that this may be a major developmental pathway in the state for substance abuse.] The same group of Canadian researchers documented that early differences in heart rate (which are hypothesized to be related to serotonin differences) from the same sample predicted both the aggression and substance abuse rates over time.[16] Other researchers in multiple cultural contexts have reported similar results to the Canadian research.

Another example involved a large-scale study conducted in the US Midwest. Pent found that school climate interacted strongly with substance abuse outcomes over time, which is shown below.[17]

Figure 24: Family and School Interaction for Adverse Outcomes



Michael Rutter and his colleagues conducted a 10-year follow-up of young people who lived in very high-risk neighborhoods in London. In that study, he likewise discovered that school climate

interacted with family and neighborhood risk factors to protect or harm the developmental outcomes.

Some of the longitudinal studies have started to reveal that the order of how drugs are started or used has a stronger prediction on lifetime problems and severity. For example, an analysis of the National Longitudinal Epidemiologic Survey suggests that early tobacco use is a stronger predictor of illicit drug use than early alcohol use.[18]

The number of multi-variant and longitudinal studies has exploded in the past 20 years. Whole publications are now devoted to their review.

Wyoming Recommendation:

While checklists of risk and protective factors are useful, Wyoming ought to be in forefront of entities moving toward the use of multi-variant analyses to predict substance use and related problems. Such methods will likely increase the cost - effectiveness of Wyoming's specific prevention and intervention strategies.

Developmental Issues

Human beings change over time from conception though adulthood. Developmental theory is the area of science that studies such issues, which are relevant to the prevention and intervention to reduce substance abuse. A brief review follows.

Conception. Human beings are not the same. We carry approximately 30,000 genes.[m] Humans do not randomly choose mates. For example, scientists have established that men who are antisocial have children, more likely than not, with women who have symptoms of major depression or clinical anxiety. And, men or women who are substance abusers almost always choose mates who are substance abusers, too.[19] This phenomenon has a rather odd name used by scientists, called non-random mating. Could this mean that the children of such parents might be born with a genetic predisposition to substance abuse?

Indeed, well controlled twin studies (identical and fraternal twins raised together and apart) show that between 30% to 70% of the variance in risk for substance abuse can be accounted for in genetic predisposition, but this may be more so for men than women.[20] Some scientists have found higher estimates for serious substance abuse, ranging as high as 90%. Apparent genetic susceptibility seems to affect the course of treatment, perhaps requiring longer treatment, different treatments, or different combinations of drugs or doses.[21]

Is it possible that some people in Wyoming could have an elevated familial (genetic) risk for substance abuse? There are no known true genetics estimate studies of substance abuse in Wyoming, but there are in our neighbor, Colorado.[22]

[m] The Human Genome Project originally postulated about 80,000 to 100,000 genes. The number turned out to be much smaller. Just recently, new evidence suggests that the 30,000 number may be too low.

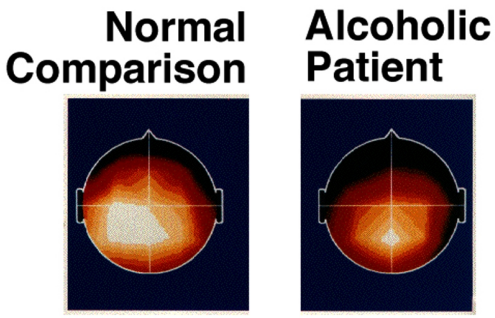
A little more than 300 identical twins and fraternal twins have been carefully followed in Colorado, whose population base shares much of our frontier history, reliance on ranching, and dependence on mineral extraction.

A recent study from Colorado[23] used standardized psychiatric interviews and personality assessments, psychiatric symptom counts for conduct disorder and attention deficit hyperactivity disorder, along with a measure of substance experimentation and novelty seeking to follow up on the Colorado twins. A common pathway model evaluated the genetic and environmental map of the constructed phenotype, suggesting that the combined trait is highly heritable (a_2 = 0.84), and is not influenced significantly by shared environmental factors (e.g., the social events shared by the twins). The results suggest that a variety of adolescent problem behaviors may share a common underlying genetic risk in Colorado young people.

Our neighbors have also discovered some other important findings about the genetics of Colorado twins.[24] Their twin research has suggested that much of the relationship between antisocial behavior and alcohol dependence is due to common genetic influences. Similar results have been reported for conduct problems (which translate into juvenile delinquency for law enforcement) and hyperactivity. In these earlier Colorado studies, statistical models revealed that the individual heritabilities were substantial: .82 for ADHD, .74 for CD, .61 for ODD, and .77 for executive function (prefrontal cortex) deficits.[n]

The differences in various behaviors, neurotransmitters, and even brain structure implied from the Colorado-twins research are not soft measures or opinion. They can be measured with electronic instruments, such signals from the brain on certain locations, with documented links to substance abuse and misuse,[25] as seen below.

Figure 25: P300 Lead Images from American Scientist[26]



Most readers of this report may have had brief exposure to genetic theory, largely from college or high-school biology. This basic view of genetics focuses on what is called Mendellian mechanism. Unfortunately, many more serious diseases we are dealing with today (e.g., diabetes, many cancers) do not follow Mendellian theory. They follow something far more complex, called polygenic theory. Substance abuse and related problems also quite clearly follow this multiple gene path,[27] which can interact or be "triggered" by environmental events such as trauma or

[n] The issue of prefrontal cortex or executive function is noteworthy, because of the increasing research on its role in addiction and academic achievement. (reference??)

stress. Individuals such as the former director of the National Institute on Alcohol Abuse and Alcoholism, has conducted studies on the polygenic variables associated with substance abuse.[28]

What are the implications of the increasing information on the role of genetics and substance abuse? This has been most troubling in the development of this report to the Legislature. To ignore the growing body of very persuasive, replicated, peer-reviewed data would violate the explicit request of the Legislature. The fact that genetics contribute substantially to substance abuse is established fact among the scientific community, and is being discussed for its implications by the National Institute on Substance Abuse.[29] It would also be unethical to hide information from policy consideration. For example, scientists rather conclusively know that there are strong genetic linkages to various forms of cancer, such as breast or colon cancer. This knowledge has led to widespread screenings for individuals with substantial familial risk, and may ultimately result in thousands of lives being saved in the United States alone.

How could the information about genetics be used for a comprehensive substance abuse plan, inclusive of prevention? As specific genetic vulnerability markers for substance use disorders become identified, application of the tools of genetic epidemiology may be employed to identify specific environmental risk factors that may serve as more accurate and powerful targets for prevention.[30] Also, with the information, there is evidence that drug treatments could be more effective, with potentially fewer negative side effects for both the individual and society.[31] Without such information, prevention and intervention efforts could be poorly targeted and wasteful of Wyoming resources.[o]

Wyoming has a history of confronting difficult issues or new concepts, such as being the first state to embrace a woman's right to vote. Wyoming could well be the first state to apply the explosion of research on genetic vulnerability to its planning for substance abuse prevention and intervention.

Wyoming Recommendation:

Our state ought to be the first state to make use of the exploding science on polygenic factors on probability of substance abuse and other problem behaviors to design more cost-effective, powerful strategies for prevention and early intervention. These new findings on the polygenic probability causes of substance abuse and related behaviors means that social-environmental strategies must be more powerful.

***Before birth and newborns*.** A baby whose mother is struggling to make ends meet, experiences domestic violence, and

[o] These findings do not in any way negate the value of doing environmental interventions to prevent substance abuse. If there are genetic predispositions to substance abuse, they must have origins as adaptations to human environments. It is most unlikely that such predispositions are "accidents."

has few or no friends, may develop differently in the womb than a genetically identical baby whose mother has a comfortable income, a happy marriage, and adequate social support. These differences are evidently the result of different patterns of hormonal secretions and other chemical responses to social stressors, which increase the risk of substance abuse and other problems.[32] These risk factors may be in addition to dangers that an fetus carries by being exposed to mother's own tobacco, alcohol, or drug use during pregnancy—also shown to elevate lifetime risk of substance abuse.[33]

Consider some important issues for public policy:

⇒ Cigarette smoking by pregnant mothers accounts for up to 20 percent of all low-birth weight babies in America.[34]

⇒ Smoking is a contributing factor in 14 percent of all premature deliveries in the United States.[35]

⇒ Rates of drinking and smoking are higher among pregnant white women than among pregnant black and Hispanic women (alcohol: 24, 20, 6 percent, respectively; smoking: 23, 16, 9 percent, respectively),[36] and Wyoming is about 86% Caucasian.

The effects of the early stressors and prenatal drug exposure works directly on the brain apparently and by altering the temperament of the newborn, so that he or she is more irritable, difficult to manage, and less responsive to caregivers. This pattern of behavior may "trigger" the style of coercive parenting or "cold" interactions that interact very negatively with infant's genetic predisposition to produce lifetime patterns of substance abuse.[37]

Wyoming Recommendation:

Our state needs to boost its pioneering early commitment to prevention and early intervention during the first few years of life, using science-based practices that might improve the developmental trajectory of our youngest citizens.

Very young children. Do toddlers evidence behavior patterns that place them at risk for substance abuse and related problems? The answer is yes, and a new book in progress from Biglan and his colleagues, that is being funded by a consortium of federal agencies and foundations, has a nice summary:

> ***Numerous studies consistently show that temperament is largely heritable and, thus, innate tendencies to be shy, aggressive, difficult to soothe, fearful, anxious, extraverted or introverted, and so forth are exhibited in their elemental form very early in life. Even as early as infancy, temperamental traits become apparent (Houck, 1999). As the baby becomes a toddler, the manifestation of these traits becomes more complex and subjected to environmental influences, eventually constituting the individual's personality. Temperamental traits that have been specifically associated with risk for delinquency and drug abuse include***

impulsivity, negative affect, extraversion, aggressiveness, high activity levels, risk taking, proneness to anger, and depression (Friedman et al., 1995; Tarter et al., 1999). There are both biological and environmental contributions to the course and longevity of these traits. However, they do tend to remain somewhat stable throughout the life span in the absence of severe psychosocial or physical trauma. Interestingly, each of these traits has been associated with specific biological and physiological responses to environmental stimuli that appear to provide the foundation for their development. There is some evidence, nevertheless, that even these biological bases may be alterable given appropriate and targeted interventions (Raine et al., in press).

What are some of the specific markers of this developmental stage signaling risk for substance abuse years later? Mildly abnormal fidgety general movements, indicative of high activity levels, have been associated with the development of minor neurological dysfunction, attention-deficit-hyperactivity disorder, and aggressive behavior.[38] Infants demonstrating low levels of emotional regulation and autonomic arousal are more likely to be noncompliant as toddlers.[39] Low cortisol levels, reflective of individual differences in the hypothalamic-pituitary-adrenal axis, have also been associated with persistence and early onset of aggression.[40]

All of these individual characteristics interact with parenting behaviors that increase the risk status of a child. Maternal stress, poverty, maternal smoking, maternal or paternal alcohol and illicit drug use and abuse, and maternal depression all reduce the likelihood that parents will provide effective care-giving and that the child will develop secure attachment relationships. The lack of early attachment predicts conduct disorder, drug abuse, and promiscuity in later life.[41]

Wyoming Recommendation:

Our state will need to deploy cost-effective practices rapidly for the reduction in inattentive, aggressive, and non-compliant behaviors among young children as well as increase the rate of pro-social behaviors by the same children at home and community settings.

Elementary age children. Genetic issues start to manifest themselves significantly during these years. Additionally, environmental variables impact the trajectory of substance abuse, misuse, and use.

Several studies further indicate that low, resting heart rate and other indicators of low autonomic arousability in early childhood are consistently correlated with later childhood antisocial and aggressive behavior,[42] which are predictive of adult or adolescent substance abuse.

Some other problems during elementary school predict substance abuse over time, which are completely unrelated to knowledge of the harmful effects of drugs:

⇒ Parental rejection, frequent critical comments, harsh or inconsistent punishment, little warmth, and lack of attention to appropriate behavior.[43]

⇒ Rejection by normative peers or hyper-popularity for aggressive actions.[44]

⇒ Academic failure for girls, learning disabilities or placement in special education for boys.[45]

⇒ Chaotic classrooms, where there are high levels of teacher attention to negative behavior and peer aggression.[46]

⇒ Entertainment diets high in TV viewing (especially with aggressive content) and, possibly, computer games.[47]

⇒ Longitudinal studies have shown that liking for cigarette ads among 10 to 12 year olds predicted initiation of smoking and choice of brand smoked, and that ownership of promotional items such as t-shirts, caps, and jackets also predicted the initiation of smoking.[p]

Again the document being prepared by the group of scientists at the Center for Advanced Studies of Behavioral Sciences at Stanford University (Dr. Tony Biglan and colleagues) provides a very complete review.)[48]

Dr. Embry, a key consultant on this plan development, and other scientists, such as the Biglan team, speculate that certain parenting behaviors and related behaviors by peers or teachers may act as accelerants (fuel) on dry tinder (the genetic predisposition) of children at risk for multi-problem behaviors. Some examples include:

⇒ Harsh or punitive parenting behaviors.

⇒ Extremely permissive parenting behaviors.

⇒ Low rates of parent attention to child positive behaviors.

⇒ Low parental warmth.

⇒ Negative, nagging behavior by teacher to target child.

⇒ Low warmth by teacher plus low rate of reinforcement of child behavior.

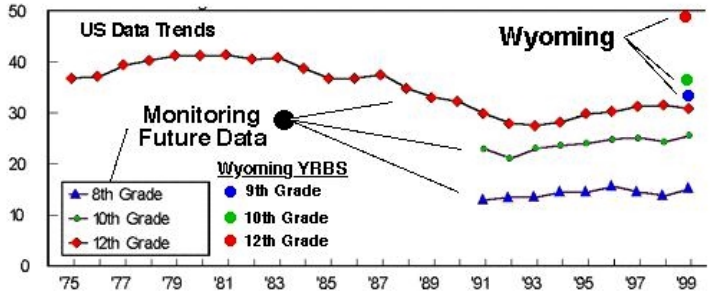
[p] While scientists have studied this, the tobacco papers discovered in the States Attorney Generals Tobacco Settlement are most instructive, particularly because they come from the tobacco industry.

Wyoming Recommendation:

Our state must expand the rapid reduction in inattentive, aggressive, and disruptive behaviors to elementary years—both at school and at home. Further, our state must reduce the causes of social rejections by peers or adults that precipitate academic failure in the intermediate grades and migration of children of that age to socialize primarily with peers who engage in antisocial acts. Another component that must be rapidly achieved is reduced victimization by peers against peers in the intermediate grades plus greater densities of reinforcement by adults at home and school for pro-social behaviors.

Adolescence. Longitudinal data from three United States cohorts suggests that delinquency, alcohol use, and experimental use of marijuana are indeed fairly common adolescent behaviors. Specifically, by the age of 17, over half of adolescents drink alcohol—though not necessarily all of the time, one quarter have smoked marijuana, almost half have committed street crimes, and eighty percent have engaged in sexual intercourse.[49] There is evidence to suggest that the degree of "experimentation" or problem behavior can vary significantly over cohorts (that is, generations), as evidenced by the data from the "Monitoring the Future" data collection for some 20 years. Figure 30 shows trends for example in binge drinking among high-school students nationally, including information on Wyoming youth.

Figure 26: Binge Teen Alcohol Drinking Across 20 Years



Generally speaking, the vulnerabilities for problems during adolescence have some roots in earlier developmental stages, but some children may not show their vulnerability until after puberty—possibly because of the changes in the brain induced by the surge of hormones and structural changes, which have only really come to be better understood because of advance measurement technology. Key factors that may affect substance abuse (not just use or experimentation) during the teen years include:

⇒ All of the previous factors discussed.

⇒ Late puberty in boys.[50]

⇒ Early puberty in girls, particularly those who attend co-ed schools.[51]

⇒ Negative and irritable moods (possibly due to hormonal and brain changes),[52] which also seems to be associated with loss in pleasure from everyday activities.[53]

⇒ Youth who drop out of school are many times more likely to be abusing drugs than young people who stay in school, as a group.

⇒ Shift in brain chemistry or structure that create a developmental limited "reward deficiency syndrome," which is now well linked to increased risk for substance abuse, misuse, and use.[54] This would mean functionally that young people would require more reinforcement[q] during their teen years than during their late childhood years.

⇒ Low rates of parental monitoring correlate with adolescent delinquent, disruptive behavior, and substance abuse or misuse plus "hanging out" with peers who may reinforce each other's deviant, risk-taking acts.[55]

⇒ Acrimonious conflict between parents and the teen typically result in poor supervision and serious aggression, often accompanied by significant substance abuse.[56]

These lists can be misleading, just as the widely used risk and protective factors lists can be. For example, one flaw of family studies that link parental monitoring and discipline to adolescent outcomes is the assumption that parenting and outcome effects are *caused* by social or environmental events. That notion was seriously challenged by a recent elegant study, which fits the research on the heavy role of genetics in the problems of concern here. Reiss and colleagues found that much of parent-child interaction problems could be explained from genetic factors (sometimes called familial factors, in the literature).[57] The study team headed up by

[q] Reinforcement is not "stuff" such as cars, toys, etc.—something that Western youth have in abundance. Rather, reinforcement is a term with meaning anchored both in psychology and biology. For something to be "felt" as reinforcing, the child or adult must engage in behavior that produces the sense of pleasure (which is related to the dopamine neuro-transmitter). Thus, what adults describe as "risky" behaviors can be highly reinforcing or rewarding to youth, especially when they have few opportunities to engage in actions otherwise that produce reward.

Dr. Tony Biglan comment on the meaning of this:

> ***Before reacting to the implications of that conclusion for prevention and intervention, consider the following information about what the term "genetic influences" might mean in this context. It is true that these genetic influences may simply be a passive genotype-environment correlation—in other words, the genes for antisocial behavior increase antisocial acts in both the mother (in the form of harsh discipline) and the adolescent (in the form of aggression). But it is also possible that the child's genetic make-up may evoke parental behaviors, which in turn influence the child's behavior (e.g., heritable temperament (irritability) provoking particular negative reactions (hostility) by mothers, which in turn makes the child more antisocial). Still another possibility is that genes may influence the child to seek out certain situations or activities in the environment (e.g., risky situations) that in turn influence both their level of aggression and their parent's disciplinary reactions. This is an example of gene activation. Each of these types of genetic influences, therefore, indicates that they are still alterable, but suggest a somewhat different tack for prevention and intervention efforts. For example, a gene-environment correlation might indicate that some (and likely many) parents of antisocial adolescents will have difficulty in applying new parenting strategies—their own temperament being to their detriment. And gene evocation influences suggest that other individuals in the environment, in addition to the parents, may require professional assistance in dealing with this particularly difficult adolescent.***
>
> ***Thus, none of these potential genetic influences should be interpreted to mean that the youth's behavior is unchangeable.***

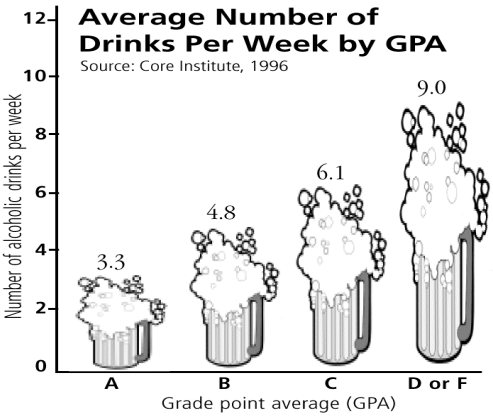
Wyoming Recommendation:

The current status of scientific knowledge has a number of implications for our state and for our adolescents in preventing substance abuse. Our state needs to rapidly: 1) promote parental competencies for raising adolescents (which can be direct or indirect); 2) increase rates at school and community levels of reinforcement of pro-social or socially meaningful behaviors among our youth of all backgrounds; 3) increased perceived connections and "warmth" between youth and non-family adults; 4) improve implicit and explicit monitoring of behavior of youth after school and evenings; 5) mitigate the adverse impact of puberty on mood and behavior by reducing perceived threat from adults and social rejection by peers; and 6) reduce perceived access to substances that can be abused or misused.

College Students or Young Adults.

Over the past decade or so, greater concern and research has evolved on alcohol, tobacco, and drug use among college students. Historically, a sort of "college kids will be college kids" notion existed, even among researchers involved in studying substance abuse. Considerable research and demonstration projects were stimulated a few years ago, and provide some insights that might be utilized in Wyoming. Academic administrators and faculty have little doubt that alcohol and other drug use has a damaging effect on academic performance. One national study[58] showed that, at four-year institutions, college students with an "A" average consume 3.3 drinks per week, whereas students with a "D" or "F" average consume 9.0 drinks per week. At two-year institutions, "A" students consume 2.6 drinks per week, and "D" or "F" students consume 5.7 drinks per week. The same study showed that sizable percentages of college students also report having done poorly on a test or project or having missed class because of their alcohol or other drug use in the previous twelve months. (See the figure below.)

Figure 27: Drinking and College Grades



Higher Education Center for Alcohol and Other Drug Prevention[59] is one of the entities now devoted to the diffusion of research on college students, and the Center reports that a variety of interventions can meaningfully reduce abuse, misuse, and use rates. The intervention research underscore that binge drinking and other problems is not necessarily a "rite of passage" but something that can be altered with positive consequences for the young people, their schools, and the communities.

Wyoming Recommendation:

Our institutions of higher learning will need to implement a variety of research-based strategies to reduce substance misuse and abuse among our college age youth, which may include: 1) restrictions on sponsorships for campus events; 2) screening protocols, 3) brief motivational interventions; and 4) infusion of information in multiple settings.

Economic & Neighborhood Issues

The Biglan study group, cited previously, shows that there are economic and neighborhood effects that increase substance use and related problems. They put forward a case that poverty interacts with other causes, which are shown in a few examples used in their publication:

> ***Specifically, poverty predicts poor supervision and inconsistent discipline by parents, which in turn increase the risk for delinquent outcomes (Sampson & Laub, 1994). Neighborhood risk factors are also associated with the stress and mental health (e.g., depression and social isolation) of parents, which in turn, has a deleterious impact on the child (McLoyd, 1990).***
>
> ***Impulsivity may also have an important moderating effect on the relationship between neighborhood poverty and criminal behavior. In a recent study of two samples of adolescents, neither poverty nor impulsivity on their own predicted increased youth problem behaviors. The combined presence of these individual and neighborhood risk factors, however, resulted in increased risk for juvenile offending (Lynam et al., 2000).***

These facts observed by Biglan and others suggest that economic or neighborhood contexts might be a very good place for interventions (not primary prevention) to reduce substance abuse and negative outcomes. For example, neighborhoods in Wyoming with high-concentrations of people on parole or probation would be good settings for community-based interventions that reduce social isolation, depression, and other factors that enter into the dynamic of adult substance abuse as well as into parent-child influences affecting substance use in children.

There are other strategies that might directly impact the economic issues. The University of Kansas Workgroup has been testing various ways to mobilize communities to improve their own economic indicators using something called the Community Toolbox. There are promising results from the Toolbox on community level indicators, such as economic development.

Wyoming Recommendation:

Certain prevention and intervention strategies need to be focused by geo-mapping to leverage results. Additional, data and training systems like the Community Toolbox need to be adopted as part of a comprehensive strategy to change community-level indicators related to substance abuse

Evolutionary, neurological, and genetic models It is now clear in the science of substance abuse, misuse, and use that evolutionary, neurological, and genetic mechanisms are at work, especially when the broader linkages are observed between aggression, violence, criminal activity, early pregnancy, and substance use.[60] Since the 1990s, there has been an explosion of sponsored research on these topics, which has been made possible by the advances in machines that enable us to "see" receptors, genes, the molecular structure of brain chemistry, and the operation of the living brain. These types of research are highly technical, but can be translated into applications for policy.

One of the most prolific and original scientists in this arena has been Dr. David Comings,[61] who is the director of the Department of Medical Genetics at the City of Hope National Medical Center, in Duarte, CA. Dr. Comings provided extensive support on the scientific advances in these domains for the development advanced theory and practice for a comprehensive approach to substance abuse prevention, intervention, and treatment, as required by the legislature. In a special technical background report, Dr. Comings observes that:

> ***The primary purpose of the Wyoming HB 83 is to identify cost -effective methods of reducing substance abuse and antisocial behavioral disorders in the State. The following observations are relevant to this:***
>
> - ***The best predictor of adult behavior is early childhood***

behavior… This observation that the presence of childhood conduct disorder is the best predictor of adult antisocial behavior, alcoholism, tobacco dependence, drug addiction, and many other problem behaviors, has been replicated many times.

- *Conduct disorder is behavior that violates the rights of others [at school, at home, and in the community]…such as:*

  a) *aggression to people and animals, including threatening or intimidating others, starting fights, using a weapon to cause harm to others, being physically cruel to people or animals, stealing from people, or forcing others into sexual activity,*

  b) *destruction of property including fire setting or deliberately destroying property,*

  c) *deceitfulness or theft…*

- *Children with ADHD have a bad outcome [e.g., substance abuse] only if they also have conduct disorder, which can be seen from the Minnesota Twin study.*

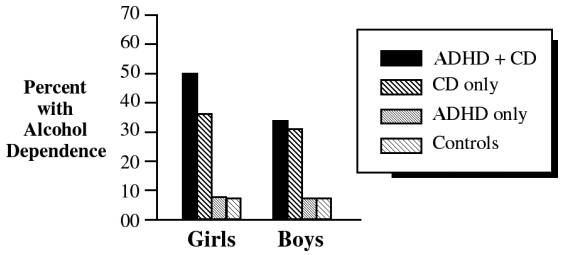


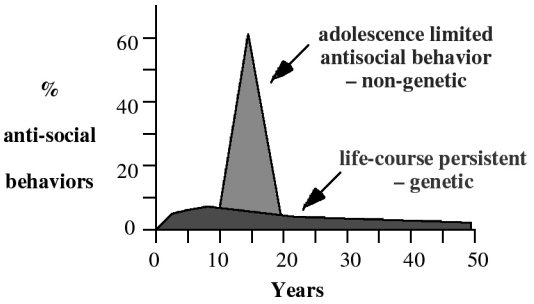
Figure 28: From the Disney et al. study of Minnesota Twins.[62]

- *Conduct disorder is strongly genetic…[but can be altered by powerful interventions, which may include medications].*

- *About half of the children with CD become antisocial adults. All of the studies reported [in the technical document] show that only about half of the children with conduct disorders become antisocial adults. It would be very helpful to be able to distinguish the children likely to have a poor outcome from those with a good outcome [and provide more potent interventions.]*

- *Adolescence-limited and life-course-persistent antisocial behavior are different. Twin studies have shown that genetic factors play less of a role in the antisocial behavior of adolescents than in adults [which is good news for Wyoming].*

Figure 29: Life course persistent and adolescence limited form of antisocial behavior. From Moffitt *Psychological Review* 100:674, 1993



- ***Behavioral disorders are polygenic. There is no such thing as a gene for bad behavior, for conduct disorder, for alcoholism, for aggression, or for criminal behavior. Behavioral disorders are polygenic, due to the additive effect of many different genes, each contributing to only a small percent of the picture (variance), and interacting with the environment.*** [85-87] ***In contrast to disorders like Huntington's disease, hemophilia, and cystic fibrosis, which are due to a single abnormal (mutant) gene, polygenic disorders are due to the additive effect of many genes, consisting of hypo- or hyper-functional variants. Any single gene is not sufficient to cause problems. It is necessary to have a given individual inherit a number of these gene variants, especially when they involve a common pathway, in order to cause problems. We call these*** **polygenes.** [85-88] ***While this makes the identification of the sets of genes involved much more difficult than for single gene disorders, scientists have developed methods that allow the identification of these genes. This technique involves testing to determine if the frequency of the genotypes of single nucleotide polymorphisms (SNPs) at candidate genes are different in subjects with conduct disorder, substance abuse, or other behaviors, compared to controls that do not have these behavioral disorders.***

Dr. Comings suggests that Wyoming, because of its small size and willingness to be a leader, be the first state in the Union to apply this knowledge to improve the outcomes of people with substance abuse or related behavioral problems. For example, it is now known that certain medications work better with people who have different genes, and that the interaction between what the genes do (typically express proteins, for example) and the medications could mean that Wyoming citizen or youth could relapse, get worse, or get much better. These interactions are not trivial in a policy context. For example, some of the medication can have the serious side effect of inducing bi-polar disorder or even homicidal actions. Wyoming was recently the site of a nationally significant lawsuit involving just such an issue, wherein a Gillette man murdered family members two-days after starting one of the new anti-depressant medications. If the medication had been prescribed under the auspices of state-sponsored care, the plaintiff's attorneys might have had a major claim against the state—especially given the Olmstead Decision. Thus, Dr. Coming's suggestions bear special consideration in

the development of a comprehensive plan for Wyoming.[r]

Wyoming Recommendation:

Our more vulnerable Wyoming young people typically have extensive histories of trial and error prescription medications to regulate behaviors predicting multi-problem behavior. Such trial and error for vulnerable children and youth is probably wasteful in state resources and potentially quite harmful to the safety of the child and society. From a successful intervention perspective, we urge that Wyoming adopt various tests (even those deemed "experimental" by Medicaid) to assist in accurate diagnosis and treatment of very high-risk children and youth, particularly children in the care of the state whose lifetime costs of care may easily exceed hundreds of thousands of dollars. New scientific tests may include polygenes, scans and other instrumentation coupled with advanced decision trees.

Current Theory Synopsis

At the Stanford Center for Advanced Studies of Behavioral Sciences, a group of about 20 scientists and scientist practitioners, under the leadership of Dr. Tony Biglan, assembled during the academic year 2000-2001 to create a consensus document on current theory and science of children and youth with multi-problems, which includes substance abuse. (It is unwise to present a model that "just" predicts substance abuse, because of the documented inter-links between problems.) That document will be published as a book. The results were first revealed at the Society for Prevention Research, in Washington, DC, and subsequently at the 2nd Prevention Conference by the National Institute on Drug Abuse, also in Washington, DC. The table below provides a brief summary of the predictors of young people with multi-problems.

[r] The technical report by Dr. Comings will be made available as a separate appendix, available on the web.

Wyoming Recommendation:

Our state needs to adopt a science-driven model of multi-problem prevention and intervention, rather than "content" or "subject matter" model of prevention (e.g., tobacco prevention, marijuana prevention). In addition, our state must pay particular attention to early intervention and prevention among children on the trajectory of multi-problem behaviors—not simply the categories of time-delimited adolescent experimentation among the large group of teenagers and young adults who actually have little or no use.

Figure 30: Multi-Variant Developmental Predictors of Multi-Problem Youth

	Prenatal and Perinatal	Infancy and Early Childhood	Middle Childhood	Puberty and Adolescence	Adult Outcomes
INDIVIDUAL	▪ Genetic Predisposition	▪ Genetic expression of risk traits ▪ Negative affect, impulsivity, and over/under arousability	▪ Genetic expression of risk traits ▪ Negative affect, impulsivity, and over/under arousability ▪ Executive cognitive deficits	▪ Genetic expression of risk traits ▪ Negative affect, impulsivity, and over/under arousability ▪ Early (girls) or late (boys) puberty	**Outcomes of Substance Abuse, Mental Illnesses, Criminal Behavior, School Failure, Teen Pregnancy, Motor Vehicle Injuries, Domestic Violence, Sexually Transmitted Diseases, & Poor Work Performance**
FAMILY	▪ Prenatal and perinatal complications including maternal smoking, alcohol and drug use	▪ Poor mother-child interaction ▪ Parenting: o Poor monitoring o Parent-child conflict o Harsh and inconsistent discipline ▪ High-media viewing	▪ Poor monitoring by parents ▪ Parent-child conflict ▪ Harsh and inconsistent discipline ▪ High-media viewing	▪ Poor monitoring by parents ▪ Parent-child conflict ▪ Harsh and inconsistent discipline	
PEERS	▪	▪ Peer-to-peer aggression	▪ Poor peer relations/rejection	▪ Association with deviant peers	
SCHOOL	▪	▪ Disruptiveness	▪ Academic difficulties	▪ Poor transition to middle school and high school	
NEIGHBOR-HOOD & COMMUNITY	▪ Environmental stress ▪ Exposure to heavy metals	▪ Environmental and psychosocial stress ▪ Exposure to heavy metals such as lead.	▪ Environmental and psychosocial stress ▪ Availability of weapons/ substances	▪ Environmental and psychosocial stress ▪ Availability of weapons/substances	
ECONOMIC	▪ Poverty ▪ (Inadequate nutrition)	▪ Poverty ▪ (stimulus deprivations)	▪ Poverty ▪ (Neighborhood disorganization)	▪ Poverty ▪ (Neighborhood disorganization)	
Typical Outcomes	▪	▪ Aggression	▪ Aggression ▪ Tobacco Use ▪ Alcohol Use	▪ Aggression & Violence ▪ Tobacco Use ▪ Alcohol Use ▪ Other Drug Use ▪ Risky Sexual Behavior	

What Doesn't Work

The belief that "anything is better than nothing" to prevent substance abuse is not supported scientifically. Substantial evidence shows that some well-meaning prevention or intervention strategies actually *decrease* public safety.

Put All the "Bad" Kids Together

Communities, schools, and many professionals often want to remove "the bad kids" and put them in a program together. Emerging evidence suggests that bringing a group of at-risk youth together in a bad-child-only group creates a negative contagion effect, articulated by one of the Wyoming Think Tank consultants, Dr. Denise Gottfredsen.[63] Dishion and Andrews randomly assigned 119 at-risk families with 11- to 14-year-olds to one of four intervention conditions: parent-focus-only, teen-focus-only, parent-and-teen focus, and self-directed change.[64] Results showed positive longitudinal trends in substance use in the parent-focus-only group, but suggestive evidence of negative effects in the teen-focus-only condition. Dishion and his colleagues were able to show later that in the teen-only group that youth subtly reinforced each other for deviant behavior, increasing later delinquency while following some well-documented laws of behavioral psychology.[65]

These and other results call into question putting high-risk youth into groups where insufficiently trained staff cannot control and improve *group norms or influence.* Other studies strongly endorse the idea that youth need exposure to positive adult role models—parents, teachers, and group leaders—who can provide opportunities for youth to learn behavior skill, social competencies, emotional regulation, and higher levels of moral thinking. Among children and youth with higher levels of risk (predisposition) toward substance abuse and multi-problem behavior, there are some general principles for strategies that can backfire or fail to work.

Wyoming Recommendation:

Our state should be very careful about funding or supporting programs or strategies that aggregate high-risk children or youth together. This caution includes correctional or "diversion" programs for Wyoming youth. If such programs are funded, they must come with: 1) a strong scientific pedigree showing positive results with low negative side effects; and/or 2) a data monitoring system sufficient to detect adverse consequences to the children, youth, or society.

School-Based Drug Curriculum

A 1996 review summarized one of the major dilemmas educational programs in schools have about substance abuse:[66] Evaluations of school curricular drug control efforts show they are only modestly successful, because they are based on an inaccurate theory of drug taking. Social control theory is suggested as a better model to explain drug taking and drug resistance. Building strong bonds to school acts to decrease the likelihood of

interaction with delinquent peers and thereby decreases delinquency and drug use. Yet schools are sites of stratification and competition, and strong bonds may be related to one's place in the school hierarchy. If schools are unable to produce sufficient positions in the hierarchy, those with low levels of academic success or commitment may turn to the drug subculture to find status and rewards.

Wyoming Recommendation:

No state funds should be expended on prevention programs that simply teach information about drugs, inclusive of the extensive pamphlets, road shows, seminars, videos, and other materials or services. Such expenditures achieve no effect *and may even be harmful.*

Zero Tolerance

An editorial sponsored by the US Council for Children with Behavioral Disorders stated that many adults are lulled into believing that zero tolerance serves the causes of safety and social justice, but safety and justice are both poorly served. Tolerance is not truly zero (only those caught are punished); educators' discretion is removed in matching the seriousness of the offense to the punishment; and the need for reinforcement of alternative behavior is ignored. Zero tolerance is often implemented clumsily, vindictively, and with horrendous results that undermine social justice.[67]

Another scientist after reviewing the available evidence concludes:[68]

> ***Despite a dramatic increase in the use of zero tolerance procedures and policies, there is little evidence that these procedures have increased school safety or improved student behavior.***

No federal or Wyoming mandate of suspension or expulsion for drug-related offenses exists, yet the application of zero tolerance to drugs or alcohol has become quite common nationally and statewide, from discussion with Wyoming educators and students.[69] Some districts have started to expel students who have or are caught using drugs, alcohol, or tobacco.[70] *Does it work?* Most recently, a study conducted by the Education Policy Center at Indiana University concluded that zero-tolerance policies in schools are less than likely to improve student behavior regarding alcohol or other drugs.[71] After all, these students now have less supervision than ever.

Public safety concerns of Wyoming communities are other reasons to question the validity and utility of expelling students with substance abuse issues, reflected by testimony in another state by a packed room of parents.[72] Said one parent, ***"To me, expulsion is getting rid of the problem for the school but not for the community."***

Wyoming Recommendation:

The Departments of Health, Education, and Family Services need to collaborate to promote strategies to reduce the behavioral interactions that predict suspensions and expulsions as well as provide grants, incentives, and effective strategies to reduce substance use by high-risk youth and aid their re-entry into educational processes. *Zero tolerance policies applied to substance use may be increasing substance abuse in society and teens, rather than decreasing it.*

Drug Free Zones

Although less than 1% of the drug-dealing cases involved sales to minors, almost 80% occurred within school zones according to national research. A study released by Join Together, a project of Boston University School of Public Health, found that the 1989 Massachusetts School Zone Anti-Drug law failed to drive drug dealers away from Massachusetts's schools. The Join Together study reviewed the role of the law, which gives a mandatory two-year sentence for selling drugs within 1000 feet of a school property, in 443 drug dealing cases in the Massachusetts communities of Fall River, New Bedford, and Springfield.[73] The study employed aerial photography and geo-mapping.

Based on testimony from young people convicted for drug-related offenses in Wyoming or sent to treatment from Wyoming, there is little reason to believe these findings would not be replicated in our state. Additionally, this policy does not address or resolve drugs received from family members

Special Education Issues

Are special education students more likely to have difficulties with substance use, misuse, and abuse? The answer is clearly yes, which is why some of the universal strategies do not work appropriately for many of the more high-risk youth.[74] First, many universal strategies exclude special education youth. Second, some special education youth bear a higher genetic or social load factor for substance abuse. Ignoring the needs of special education students in prevention efforts or intervention approaches is likely to have adverse consequences.

Blame Games

The notion of just saying, "Oh, it's those people who ____" is often socially appealing as a quick fix. In the treatment section of this report, it has been made clear that evidence does not support blaming the addict as an effective strategy to reduce substance abuse or reduce harm to the public. "All doors must lead to treatment" in the case of current addicts. In a similar vein, it is clear that effective prevention and intervention in Wyoming must adopt the same stance—"All doors in Wyoming lead to powerful prevention and effective intervention" to reduce substance abuse, substance misuse, and use.

We are a resource state. Our most precious resource is our children, who are declining in number about 2,000 per year, as the population grows older and older.

When something threatens the purity of our resources, we are quick to act in Wyoming.

Alcohol, tobacco, and drugs are affecting our children more than most states. The purity of our rarest of resources is being compromised.

As we have used our collective knowledge to protect our natural resources in Wyoming, we can use our political will and knowledge to protect our kids—for their future and ours.

—Dr. Dennis Embry on Wyoming Public Television's "No Rite of Passage," a special program hosted by Governor Jim Geringer and First Lady Sherri Geringer.

Promising Possibilities for Changing the Odds

An extensive literature now exists on changing the odds of substance abuse through prevention and intervention. It is not possible in this report to review and summarize the entirety of that literature. This report highlights some promising practices that could be or are being applied in Wyoming in a cost-effective way. These promising possibilities could substantially change the odds in Wyoming if used, maintained, expanded, or strengthened.

Early Nursing Visits

Wyoming was the first state in the Union to adopt the Olds Model for early home visitors, according to the people responsible for supervising the replication of the Olds Model.[s] The Olds Model has extensive research showing its positive impact on reducing multi-problem behavior, including substance abuse.[75] The Model is referenced in such documents as various Surgeon Generals' Reports.

Since Wyoming was the first state to use the model outside of research, much has been learned over time about effective training and programming to support the effort. This is to be expected. Interviews in the field and meetings with key supervisory staff suggests that the training and support needs to be boosted considerably to enhance the skills of our

[s] David Racine, President
Replication and Program Strategies
2005 Market Street, Suite 900
Philadelphia, PA 19103

pioneering home visitors, in part because of the knowledge gained from replication research and our field experiences.

Some specific focus of the enhanced support and training needs to be more about the substance abuse interventions and treatment of our Wyoming mothers, given the data in our state showing that our mothers use about 3 times the national rates.

In their extensive review, the Biglan Group at the Center for Advanced Studies of Behavioral Sciences makes this comment about the Olds model, which has relevance for Wyoming:

> ***Olds' nurse visitation both before and after the birth of the child can have significant benefit in preventing diverse problems in adolescence including delinquency, high risk sexual behavior, smoking, alcohol use, and illicit drug use. However, these benefits were found only for the families in which the mother was unmarried and from a family of low socioeconomic status. In addition, the providers of this program were nurses who, themselves had children and who displayed considerable life experience and wisdom, according to the program developers [Olds, 1988 #993]. Their professional training and experience may have been critical to the success of the program.***
>
> ***Olds and Kitzman's (1993) review of nurse visitation studies supports this contention. They evaluated 31 home visiting programs that had been evaluated in randomized controlled trials, and found variable effects, with some programs producing positive outcomes and others finding no effects. Their review also indicated that programs that employed para-professionals did not achieve as good outcomes as those in which professionals provided the services. Therefore, simply providing nurse visitation services without attending to the content of those services is not likely to be sufficient to replicate Olds et al.'s findings. Unfortunately, Olds et al. do not provide data on treatment components, treatment process, or treatment integrity. As a result, it is impossible to know the extent to which nurses followed the treatment protocol as described. Nor can relationships between the types of services the nurses provided and outcomes be examined.***

Wyoming's commitment to early visitation and first adoption of the research-based program is noteworthy, and our state's commitment needs to be bolstered by attention to the findings of Biglan's Group and the insights of the Olds replication team.

Wyoming Recommendation:

Extensive staff development needs to be undertaken to support and expand the skill of nurses engaged in the Olds Home Visiting Program in Wyoming, and such training needs to be tested in terms of effectiveness.

Hospital-Based Neonatal Assessments by Primary Caregiver

A rather simple but promising practice for prevention and intervention involves having mothers of newborns give a special assessment to their own babies, typically using the "Mothers Own Brazelton Neonatal Assessment (MBAS)." Coaching the mother to do this seems to increase the ability of the parent to understand their infant, bettering reciprocal interactions. The net effect of using the this type of intervention is reduced early child abuse, fewer health problems, and other measures of developmental markers that fit into the developmental pathways model of substance abuse depicted earlier in this report.[76] Mother's own depression improves, too, which is an important issue because of the epidemiological links of depression with substance abuse among adult women—especially those who live in high-risk circumstances. This kind of "mother's own" neonatal assessments have begun in a small way by the Wyoming Health Department, and merit expansion to a universal prevention strategy for all post-partum moms in Wyoming in the first few days after birth, because of the cost-effective nature of the strategy and the number of mothers who are using drugs during their pregnancy that tend to alter care-giving patterns or increase depression.

Wyoming Recommendation:

The Department of Health should undertake a public-private partnership to assure that every mother engages in a mother's own neonatal assessment to increase maternal-child reciprocity linked to protective development. This cost effective intervention needs to be undertaken with due speed, because of the rates of prenatal smoking and associated depression.

Development Guidance and Records

Some countries (e.g., New Zealand, Australia, Japan) have instituted a universal program of health records to support families and children in positive developmental and health outcomes. All of these countries have lower health and adverse developmental outcomes than we do in Wyoming, according to various reports available from the World Health Organization. Effective developmental guidance and records have long been known to be a powerful way to open doors for effective prevention and intervention, which is why various organizations like the American Academic of Pediatrics support what is called "anticipatory guidance" interventions. Recently, the Federal Medicaid regulations have established Early Periodic Screening, Diagnosis, and Treatment programs (EPSDT), which will pay state-approved Medicaid providers for conducting such services.

Universal Developmental Records for all children have the following characteristics:

⇒ Every child and family has access.

⇒ The records provide a way for the parent or guardian to communicate in a consistent way about developmental progress of the child.

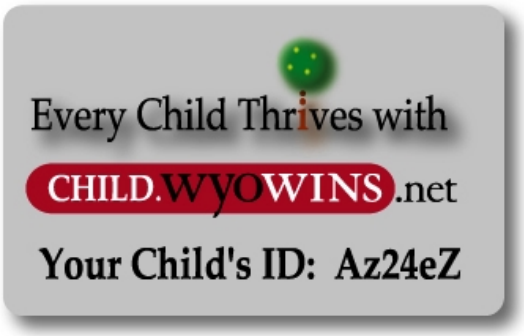
⇒ The record details ways for parents or caregivers to respond better to common developmental problems (health, disease, or behavior).

⇒ The record flags when to seek intervention.

Japan, New Zealand, and Australia have used paper and bound versions of the Developmental Record Concept. Thus, every parent gets a special book, and every health care provider gets back-up and linked reference books to provide the best developmental guidance.

The World Wide Web provides the concepts pioneered elsewhere with greater chance of being timely and powerful, especially given how fragmented our society has become. Every Wyoming parent could be given a Developmental Record Book along with a special access card (only they have the number, and no data are stored with the name) to a user-friendly database for developmental guidance and record keeping.

Figure 31: Example of Parent's Card for Child



Early screening, universal record keeping (so that it can be shared easily as a child moves or has other circumstantial changes), and the provision of appropriate prevention or intervention strategies during infancy, early childhood, and even adolescence can have profound positive effects on reducing the onset, severity, or progression of developmental disorders related to substance abuse and other problems that threaten public safety. Elements of this idea have started in the Wyoming Department of Health and could be expanded.

One such project involves work from the Oregon Research Institute called First Steps for Success, which has very strong scientific results.[77] Wyoming has taken national leadership in this effort by having advocacy organizations involved in the implementation, training, and support of the tools and procedures for early screening and intervention with a recently funded national demonstration project in collaboration with UPLIFT in Cheyenne (Wyoming's Federation of Families for Children's Mental Health). The current project involves children four years and older, excluding those who are younger.

Wyoming Recommendation:

The Department of Health, in partnership with other agencies and the private sector, will develop a Developmental Record Book and Records system available to all Wyoming families and health providers, which will enable families to receive anticipatory guidance and link to more powerful advice when a child has higher levels of health or behavioral difficulties. The System would have extensive safeguards to assure that the records are in the control of parents or caregivers.

Other School-based approaches Earlier sections of this document suggested that many school-based efforts fail to produce the prevention or intervention effect needed in a comprehensive plan for the state of Wyoming. Some science-based practices are reviewed here that may work well in the Wyoming context.

First Steps for Success (for Kindergartners).

This program has just been started in Wyoming, as described above. First Steps is a collaborative home-school intervention for preventing antisocial behavior (a major predictor of substance use in later life) for at-risk kindergarten children at the point of school entry.

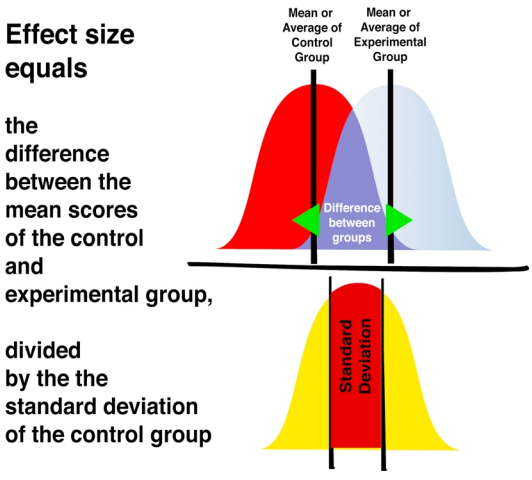
The intervention has to be carefully coordinated and involves the three social agents who have the greatest influence on the developing child; that is, parents and caregivers, teachers, and peers or classmates. The program has robust effects, does not require highly degreed professionals to implement, is cost effective, and seems to have long-term effects in controlled studies—saving money in placement costs for special education services to boot.[78] A kit for a kindergarten teacher is only a few hundred dollars, and the approach, if expanded, could well benefit Wyoming.

Wyoming Recommendation:

The Departments of Health, Education, Family Services, Corrections, and Workforce Development shall collaborate on the expansion of First Steps to Success intervention for children to be universally available to all appropriate kindergarten classrooms or kindergarteners.

Social Influences and Life Skills Training in Middle School. Extensive research exists on school-based programs like Project Alert, Toward No Tobacco, the Lifeskills Program by Dr. Gil Botvin, and others. These meet many definitions of best practices. Their effect sizes tend to hover around .14 to .2,[t] which is not large but can have practical benefits for reducing tobacco, alcohol, and other drug prevalence rates by adolescents. Extensive reviews of the effects of these programs can be found at government-sponsored web sites. These programs are to be much preferred over knowledge-based programs, scare tactics, self-esteem models, and other ineffective strategies.

[t] An effect size is a standard means of expressing differences across studies, showing differences between experimental and control groups in terms of standard deviation. An effect size of +1.00 indicates that the experimental group outperformed the control group by one full standard deviation. To give a sense of scale, this would be equivalent to an increase of 100 points on the SAT scale, two stanines, 21 NCEs (normal curve equivalent ranks) or 15 points of IQ--enough to move a student from the 20th percentile (the normal level of performance for children in poverty) to above the 50th percentile (in range with mainstream America). In general, an effect size of +.25 or more is considered to be socially or clinically significant. Effect size scores of .5 or more are very desirable.



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Life Skills Training (LST) produces significantly less heavy drinking reported by LST than by control students 6 months after the intervention. In an even more impressive follow-up, the researchers assessed a large, mostly middle class, white sample and found that treatment affected reports of cigarette smoking, getting drunk, and polydrug use 6 years after the intervention, suggesting that LST may prevent some of the serious problems that characterize multi-problem youth. Some intriguing results emerge from Dr. Gil Botvin's work, which should be held in mind in designing Wyoming strategies:

⇒ Only peer-led, not teacher-led, LST produced better results among experimental than control participants.

⇒ Follow-up data indicated that the experimental group continued to do

[v]

better than controls only if they received booster sessions from peers.

These findings from the LST research suggests that Wyoming's movement toward a Youth Development Model at a sub-cabinet and cabinet level, as directed by the Governor, ought to focus on peer-led (adolescent) substance abuse programming, with empirical results. This could be very effective in addressing the concerns that teachers have of feeling considerable overwhelm from the increasing demands of academic accountability. The kids, if well trained, do a better job than the adults.

Wyoming Recommendation:

The Wyoming Youth Development Sub-Cabinet will undertake support and expansion of research-validated practices and programs that use youth effectively in reducing substance abuse.

Developmental Approach and Social Emotional Competencies Some approaches have taken a more protective factor slant, developing the social and emotional competencies of young people as a school-wide effort. Several of those types of approaches do show some protective value, including reduced substance abuse over time.[79] One such approach, the Child Development Project, does not teach anything overtly about drug, alcohol, or tobacco. This suggests that there are other pathways, perhaps more powerful to substance abuse than knowledge of substances or their harm.

What might the mechanisms be? One of the hypotheses, based on consultations with national experts and the review of the literature, is that providing certain types of environments addresses the underlying neurobiological, genetic, social, cognitive, and emotional "drivers" of substance abuse, misuse, and use. Such school and community environments would assure:

⇒ Peers and adults extensively reinforce children's pro-social and academic behaviors.

⇒ Social skills are modeled, reinforced, expected, and "set up" by various rituals, routines, or instructional methods.

⇒ Children, particularly higher risk populations, do not receive perceived harsh, negative, or inconsistent "punishments."

⇒ Children are reinforced for inhibition of negative behavior (e.g., "thank you for not…").

⇒ Environmental arrangements (which can be social) reduce opportunities to engage in negative behavior, bullying, being victimized, or being rejected by adults or normative peers.

⇒ Many opportunities exist for children to have meaningful roles and imitate others who do.

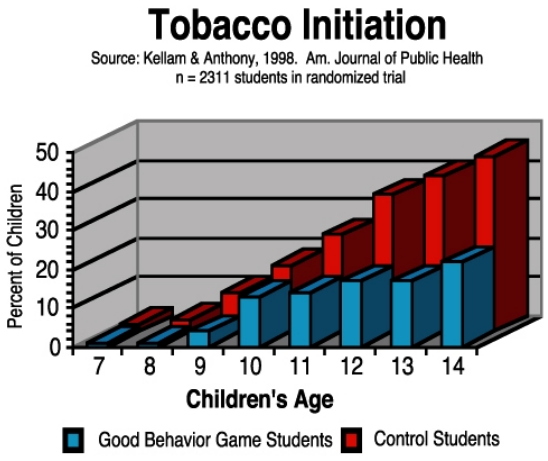
⇒ Social warmth and reduced threat from adults exist.

⇒ Response cost (a technical term from behavioral psychology) is quick, consistent, and not too punitive.

There is evidence to suggest that these principles can be powerfully infused in a school or community, with reductions in risk of substance abuse.

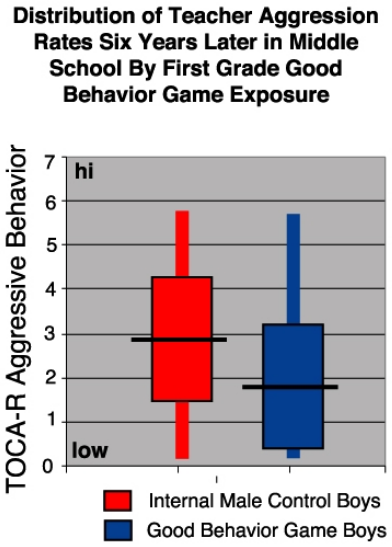
Kellam and his colleagues published a report evaluating the impact of using the Good Behavior Game in elementary schools on substance abuse a decade later. This Game has become a gold standard for early prevention of substance abuse. It rewards inhibition of negative behavior through a response cost procedure, while increasing time in engaged learning. The impact of the Game on substance use was exceptional a decade later. For example, the rate of tobacco use in middle school was cut from 25% to 50% overall just from something done in first and second grades.[80] The figure below shows the impact of the Game on several thousand students.

Figure 32: Effects of the Good Behavior Game



The benefits of the Game are not limited to tobacco, alcohol, or drug use. Clinical levels of aggression (the type related to conduct disorders and juvenile crime) were reduced to "normal" levels during elementary school, and then fell below that as a "sleeper" effect in middle school—an exceptional result for something so simple.

Figure 33: Good Behavior Game Effects on Aggression



From Kellam et al. (1994). Journal of Child Psychology and Psychiatry and Allied Disciplines

Wyoming is the first State in the Union to fund the replication of the Good Behavior Game, attempting to customize it for use in Wyoming conditions in the context of the 15,000 Hours Initiative being funded by the Governor's Advisory Board on Substance Abuse. The expansion of the Good Behavior Game, so that every teacher could use it, might provide substantial benefits to the state, given the fact that the Biglan study group reports that the Good Behavior Game is unique in that it does not require that a whole school use it—only the individual teacher to achieve effects.[w]

[w] The report by the Biglan team is quite extensive, and a review of the Game is also under revision for publication by Dr. Embry.

Wyoming Recommendation:

The Department of Health and Education, in collaboration with other interested parties (e.g., Wyoming Education Association) will undertake a rapid, state-wide project to diffuse the tools and procedures necessary for every teacher in elementary grades to make use of the Good Behavior Game and related strategies on a voluntary basis.

In February of 2000, the Governor's Advisory Board hosted a Wyoming Think Tank on Vision 2020. Some 15 national experts were invited to work with about 40 Wyoming leaders for applying good science in the Wyoming context. Several national scholars presented ideas that might be applied from the research.[x] Dr. Denise Gottfredsen talked about how schools could develop their organizational capacity, through action-science, rewards for student behavior, and other strategies. Dr. Gottfredsen summarized her commissioned report to the Congress on school-based prevention, which showed that these principles could reduce substance abuse among students.[81] Dr. Gottfredsen notes in her report:

> ***Programs aimed at setting norms or expectations for behavior, either by establishing and enforcing rules[y] or by communicating and reinforcing norms in other ways, have been demonstrated in several studies of reasonable methodological rigor to reduce alcohol and marijuana use and to reduce delinquency. Note, however, that schools where rules were manipulated also used school teams to plan and implement the programs, so it is not possible to separate the specific effects of school rules and discipline strategies from the more general effects of encouraging teams of school personnel to solve their schools' problems.***

Some of these ideas have been incorporated in this document, such as in the work of Dr. Embry for the State of Wyoming. Dr. Kris Bosworth, another national expert, explained an extension of Dr. Gottfredson's work in the broader context of resiliency emerging the idea of Protective Schools—with a focus on enhancing the capacity of the schools to sustain and support innovation. Dr. Bosworth drew on the work of Sir Michael Rutter, who was able to show that simple structures in schools could significantly reduce the problems associated with substance abuse (e.g., juvenile delinquency). For example, frequent posting of student work on the walls increased achievement and reduced measures of delinquency—for high school youth living in high-risk neighborhoods. Dr. Tony Biglan talked about how youth, in and out of school, could be mobilized to reduce tobacco use through very simple procedures, some of which were adopted and used by Wyoming to reduce its sales of tobacco to minors from 55% to 8.96% in one year—setting a record for change in America. Some of the other

[x] Various papers by participants will be posted on several web-sites.

[y] Dr. Gottfredson is not recommending a zero tolerance, a harsh or punitive campaign here, which some have interpreted in error from her research.

recommendations made by Dr. Biglan have not yet been acted upon, but are included in this the context of the overall report for HB 83.

Dr. Daniel Flannery spoke about work with Dr. Dennis Embry in altering school climate in a large-scale randomized study,[82] showing that social competencies and higher-purpose norm promotion protects against multi-problem behaviors, and can be easily implemented by schools. Dr. Flannery also talked about the work in teaching child development and special policing strategies to law-enforcement that can reduce substance abuse and other problem behaviors in children or youth, as well as about something called the Young Ladies/Young Gentlemen's Club that is protective for higher risk youth. Dr. Flannery explained that the school lunchtime club, which can be run by volunteers, has strong effects on reducing problem behaviors.[83]

Previously, this section discussed the work of Dr. David Hawkins and "Rico" Catalano on the risk and protective factors "checklist." They also have done extensive research on social development and the prevention of substance abuse.[84] The Seattle Social Development Program (SSDP) provides teacher training, social skills and problem-solving training for children, and parent training during elementary school in the interest of preventing drug use. The approach provides parent training, teacher support for behavior management, refusal skills, and problem solving for young people. The approach spans Grades 1-5 in a coherent way.

Teachers in grade 1 classrooms deliver a problem-solving curriculum to children to think through alternatives to problem situations. Professional staff present voluntary, parent-training classes offered each year. In grades 1 and 2, a 7-session parent training program is taught to parents to pinpoint positive and negative child behavior and to provide appropriate consequences for each using modeling, role plays, feedback, and homework assignments. In grades 2 and 3, staff teaches a 4-session program designed to help parents use good ways of helping their children in reading and arithmetic. Finally, in grades 5 and 6, staff provide a 5-session program designed specifically to reduce the likelihood that the child will initiate drug use by establishing a family policy on drugs and alcohol, helping parents to teach their children skills for resisting peer influence to use drugs or alcohol, working on skills to reduce family conflict, and creating new roles for children in the family as they mature.

The Biglan Group reviewed the results of the Hawkins and Catalano approach, which offers some useful insights for prevention policy:

> ***Hawkins and colleagues evaluated the effects of their intervention when the children were in grade 2 [Hawkins, 1991 #143] and at the beginning of grade 5 [Hawkins, 1992 #141], when they also examined effects for a low-income (highest-risk) sub-sample [O' Donnell, 1995 #440]. Of greatest interest here is Hawkins et al.'s [, 1999 #994] follow-up when the children were 18 years of age, when they assessed lifetime crime,***

substance use, and sexual activity data. Analyses revealed no significant differences between those who received the intervention only in grades 5 and 6 and the controls on substance use, delinquency, or sexual behavior. In contrast, the full intervention produced significantly fewer reports of lifetime violence, sexual intercourse, number of sexual partners, and (for working and middle class youth only) pregnancy. Measures of drug, alcohol, and cigarette use were unaffected by the intervention.

The combined research on the various methods is extensive. The full body of research is very promising and also elucidates some issues for policy on prevention and intervention about funding and timing issues.

⇒ Inhibition of aggressive, disruptive behavior in the primary grades appears to have a much stronger long-term pay off than more problem-solving or academic approaches in reducing lifetime substance abuse.

⇒ Carefully planned reinforcement strategies for pro-social behaviors have positive protective benefits across almost every grade level.

⇒ Certain types of parent training strategies in the models (focus on family drug policy, resisting peer pressure) may be ineffective, though have surface logic (but represent weak variables).

⇒ Strategies that increase social competencies (specialized life skills), particularly among older pre-teens or adolescents, do have protective value in terms of reducing substance abuse.

⇒ Setting norms or expectations for behavior, either by establishing and enforcing rules or by communicating and reinforcing norms in other ways, can reduce substance abuse. Appealing to a sense of higher purpose in the norm setting may enhance the prevention effects.

The Developmental Approach or Social-Emotional Competencies Model show positive results and seemingly fit the unique conditions of Wyoming, and support the results of the Community Readiness project undertaken by the Division of Substance Abuse in collaboration with the Tri-Ethnic Center with respect to the Methamphetamine Initiative. Additionally, the developmental and social-emotional competencies model fit with the focus of the Governor's Youth Development Sub-Cabinet Committee work along with some of the grass-roots efforts toward asset building.

Wyoming Recommendation:

The Youth Development Sub-Cabinet, in collaboration with other interested parties (e.g., Wyoming Education Association) will undertake a rapid, state-wide project to diffuse the tools and procedures that schools may use to improve their overall school climate, with positive effects on reducing the problems of juvenile delinquency, truancy, substance abuse, and aggression.

Instructional Methods Intriguing evidence shows that actual methods of instruction and classroom organization buffer against substance abuse and problem behaviors.[85] There are several hypotheses why, which are not incompatible but may all be true:

1) Good instruction improves prefrontal functions in children, and poor prefrontal function has been consistently linked to elevated risk of substance abuse and related problems;

2) Good instruction reduces the risk of academic failure (e.g., placement in special services, dropping out, truancy, absenteeism, which in turn minimizes "hanging out" with deviant peers who are engaged in problem behavior; and

3) Good instruction reduces disruptive, aggressive, and inattentive behaviors both in high-risk and low -risk students—thereby minimizing individual and collective risk.

Several characteristics seem to be true about instructional methods used by individual teachers that reduce problem behaviors related to substance abuse:

⇒ Downtime and transitions are decreased dramatically.

⇒ Group reinforcements happen frequently for individual efforts.

⇒ Pace is quick and feedback frequent.

⇒ Environmental interventions (technically called antecedents) are used to reduce problem behaviors before they even happen, instead of focusing on punishment or interventions after problems.

Table 3: Kounin's List of Teaching Competencies

1. "With-it-ness." The ability to accurately spot deviant behavior, almost before it starts.

2. "Overlappingness." The ability to spot and deal with deviant behavior while going right on with the lesson.

3. Smoothness. Absence of behaviors that interrupt the flow of activities.

4. Momentum. Absence of behaviors that slow down lesson pacing.

5. Group alerting. Techniques used by teachers to keep non-involved students attending and forewarned of forthcoming events.

6. Accountability. Techniques used by teachers to keep students accountable for their performance.

7. Challenge arousal. Techniques used by teachers to keep students involved and enthusiastic.

8. Variety. The degree to which various aspects of lessons differed.

Kounin, 1971

These and related findings are as much as 30 years old, yet are surprisingly unknown among prevention researchers,

who have focused on the content of prevention (e.g. tobacco specific, alcohol specific, marijuana specific), without attention to the fact that the very nature of instruction might prevent serious lifetime problems in our youth. Some early investigators of teacher behaviors have quantified these types of instructional interactions that seem to reduce multi-problem behavior in the classroom. One of the most widely cited is by Kounin shown below.[86]:

The implications that basic instructional methods could prevent substance abuse are actually staggering for policy.

1) Individual teachers could change the course of multi-problem behavior without having to implement some "substance abuse curriculum";

2) These skills have been shown to reduce placement in special education (a predictor of serious substance abuse), which could save thousands of dollars per child per year; and

3) These skills can be taught to individual teachers so that they can become change agents.

All of these possibilities have very attractive benefits for Wyoming:

⇒ Reduction in state expenditures in special education expenses.

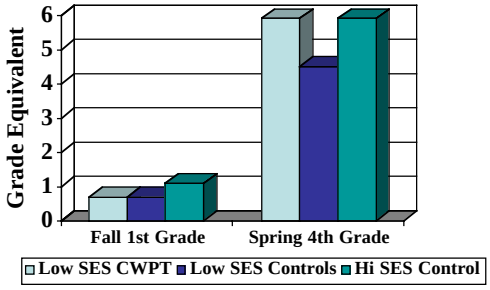
⇒ If just 100 students per year avoided needing special education as a result of some teachers learning these procedures, the state would save about $1,200,000 for each cohort of those 100 students— assuming it cost an extra $2,000 per student per year who needed six years of special services.[z] Over a decade, the sum of costs averted in special education, assuming no change in costs and a ceiling benefit of six years averted, the sum of about 1,000 students will have averted special education, saving the taxpayers at least $7,800,000. These are very conservative numbers for several reasons:

⇒ Some of the actual experiments with the methods have shown a reduced need for placement by as much as 30%; and the methods are more powerful with reducing the service needs for children with learning disabilities and/or emotional/behavioral disorders—which represents over 50% of all State special education.[87]

⇒ Aversion of placement in juvenile services.

⇒ Evidence suggests that these methods

Metropolitan Achievement Language Test Means at Fourth Grade for At-Risk Children Using Classwide Peer Tutoring



[z] Unlike many states that give lip service to special education, Wyoming actually pays 100% of special education costs, which are reimbursed to the district. Despite declining enrollments, Wyoming's expenditures for special education are significantly increasing.

of instruction by individual teachers can reduce the migration from behavior problems to full blown delinquency. For example, one long-term study suggested that randomly placing an elementary school child who was high risk for substance abuse (e.g., aggressive, disruptive, poor, etc.) for one year in a poorly run classroom versus a well run classroom more than doubled the risk of serious antisocial behavior in middle school.[88] What might be the impact financially on the state for costs averted if just 100 students per year did not migrate from oppositional defiant disorders to conduct disorders with antisocial behaviors and arrests as a result of more skillful teaching of individual teachers? Assuming that each of 100 students "saved" per year represented a lifetime cost of $50,000 each, for the state budget ($5,000,000 of lifetime state costs per year averted). Over a decade, the costs averted could amass to $50,000,000.

- Improvements in academic proficiency.
- The same individual teacher strategies that reduce special education for diagnostic categories related to lifetime substance abuse also dramatically improve measures of standardized achievement in long-term studies.[89] The effects on improvements in academic achievement can be remarkable. Greenwood and colleagues have shown that the procedures used by teachers take about 20-30 minutes day, save much time from grading, do not require new textbook purchases, can bring many low-performing students up the level of middle-class comparison students —with lasting effects, and reduce the need for special services.[90] The graph below presents standardized achievement data from one such experiment. The materials required, per teacher, cost about $125.
- Greenwood, 1991

Wyoming, as other states, would substantially benefit if the practices that improve the odds for reduction in problem behaviors were rapidly diffused, so that any and every teacher could quickly adopt simple practices, without having the adoption of a "program" which requires all sorts of local control considerations. Since many beneficial strategies can be adopted by individual teachers (the smallest unit of local control, the classroom), the prevention purposes of HB 83 can be met in some powerful, cost effective ways.

Wyoming Recommendation:

The Youth Development Sub-Cabinet, in collaboration with other interested parties (e.g., Wyoming Education Association) will undertake a rapid, state-wide project to diffuse simple tools and strategies individual classroom teachers may use improve their classroom, with positive effects on achievement and on reducing the problems of juvenile delinquency, truancy, substance abuse, and aggression.

Infusion Model. Recently, a few investigators have started researching an idea of infusing things like the Life Skills Training (LST—e.g., Botvin's work) into

every classroom and school activities to prevent substance abuse among young people. By infusion, the teachers take the ideas and "sprinkle" them across daily activities. For example, the music teacher in middle-school might have the choral class work up a "What do we do with the drunken driver?" song, the biology class might study the harm caused to human functions, or physical education might use many games to teach refusal skills or anger reduction strategies. While such an idea is often recommended and seems possibly valuable, it has never been scientifically tested until recently.

The National Institute on Substance Abuse has awarded a grant to study an infusion model of the Botvin Life Skills Training program against the standard version (already discussed), because of the very extensive research supporting its efficacy. Thus, the study is starting from a positive foundation. Early analyses to determine the effects of the treatments suggest there were no treatment effects for smoking among either high- or low-risk students, although treatment did significantly affect drinking among high-risk adolescents, but not among low-risk students. Results indicated that the Infused LST model was more costly to implement in the first year due to a larger number of teachers who were trained and who implemented the program. The cost-effectiveness differences favoring Standardized LST may be lessened, however, over time, as the infused approach becomes institutionalized and less costly to maintain. The infusion research has just begun and is limited in follow-up.

These results are of interest in several ways to Wyoming. First, Wyoming is apparently among the earliest of states to adopt Health Education Standards. An infusion model would fit these standards quite well, and it could be built as a sort of "resource" for every teacher in the state. An infusion model has intuitive appeal to teachers. Second, as mentioned earlier, the long-term effectiveness of the Life Skills Training (LST) works best if delivered by youth peers. This makes sense from a developmental theory perspective. A combined infusion model with a youth development model (which was also linked to community and media strategies) could be a powerful prevention strategy for Wyoming.

Recently, the Department of Health worked collaboratively with the Department of Education to match various risk and protective measures being used in the data collection systems against the Wyoming Health Standards, which will permit the impact of the standards on actual outcomes.

Wyoming Recommendation:

The Department of Education, in collaboration with other interested parties (e.g., Wyoming Education Association) will undertake a statewide effort to enable Wyoming teachers in every district to share, create, and adapt infusion-based strategies aligned with the Wyoming Health Standards, which would be available on the Internet.

Early Literacy. Some jurisdictions have tried early literacy, mentoring, and after-school clubs to reduce problem behavior in children and youth. Emerging research suggests that these strategies, *if properly constructed*, can have a positive, prevention impact.

At the 2001 Society for Prevention Research (SPR) Meeting in Washington, DC, data were presented that a simple, community-based effort to involve volunteers (with minimal training) to read with elementary students produced measurable gains in achievement and school success, except for children with serious phonemic segmentation difficulties. Most of the volunteers received only a few hours of orientation. The effort was tested in a nearby western state, and could be easily used in Wyoming—perhaps enhanced by other research showing that specially constructed texts or emergent literacy protocols might yet improve the effects.

Literacy appears to change the structure of the brain,[91] and such changes may buffer against developing substance abuse and related disorders among highly at-risk individuals based on data from the Youth Risk Behavior Survey (YRBS).[92]

Contests such as number of books read or pages read, especially when tied with content quizzes and prizes, seem to have some lasting positive effects. For example, private-sector initiatives like BOOK IT by Pizza Hut appear to have long-term positive effects on reading.

Early literacy can be promoted via special storybook design and free distribution. Such models have been shown to improve parent-child behavior, improve parent-child behavior, and even improve school-related behaviors.[93]

Wyoming Recommendation:

Under the sponsorship of the Governor's Office and First Lady, Wyoming would undertake a statewide effort, with a public-private partnership, to have free, specially designed storybooks available to every Wyoming young child each month—which are designed to promote early literacy, social-emotional competencies, and character as well as positive family-child relationships.

After-School Clubs. Fairly solid evidence exists that systematic, well planned after school programs (such as a photography club, a performing music club) confer protective advantage for reducing multi-problem behavior for youth in controlled studies.[94] Community partners, not just schools in Wyoming, can organize such clubs. Such things as 4-H or Future Farmers of America may also have protective value.

Formalized Mentoring. Organized mentoring programs such as Big Brothers/Big Sisters are now well documented to reduce multi-problem behavior inclusive of substance abuse.[95] Such high quality mentoring programs cost about $1,000 per volunteer-youth match. Youth who participate are about 46% less likely to abuse drugs and 27% less likely to abuse alcohol.

Study after study has demonstrated the effectiveness of mentoring programs in keeping kids away from drugs and out of other trouble. Mentoring is defined as "structured, one-to-one relationship that focuses on the needs of the mentored participant and fosters caring and supportive relationships through providing focused attention, interaction, and genuine attachment."[96]

The problem is that many mentoring relationships are too short. One study found that when the mentoring relationship lasts less than 3 months, harm is actually done to the child. Self-esteem dropped. Substance abuse increased.[97] The study concluded that mentoring must be done right, well funded, and provide adequate training and support for the volunteer mentors. "The truth is that mentoring, if it is to help children, costs money. Most groups need the government to aid these programs properly." Just as good mentors must make a long-term commitment. so it is also true of the state government.

This is an area of responsibility in which the faith community and private sector should be asked to assist. We encourage the state to offer matching grants to faith-based and other private sector organizations who are willing to make significant, long-term commitments to mentoring and other after school programs.

Wyoming Recommendation:

The Youth Development Sub-Cabinet will undertake a comprehensive process to promote high-quality mentoring. First, the agencies would use leveraged funds to promote the recruitment of long-term mentors for organizations such as Big Brothers and Big Sisters. Second, the Division of Criminal Investigation will develop a expedited system of clearing adults for long-term mentoring. Third, the combined state prevention-funding group (as recommended) would provide matching grants for long-term mentoring. Fourth, the state is the largest single employer in Wyoming. The Legislature and the Governor could implement policies encouraging and promoting the involvement of state employees in long-term mentoring, collaborating with the Department of Family Services to reach higher risk youth.

Reducing TV Viewing. Watching TV elevates risk for substance abuse and other criminal acts, particularly among children who show higher levels of aggression during childhood.[98] The impact of TV viewing can elevate many levels of risk: a decline in social competence, lower parent supervision, increase of hostile attributions, and possibly the elevation of the hypothalamus-pituitary-adrenal axis (increased stress hormones that may affect other neurotransmitters and even receptor site expression). A variety of experiments have shown that reducing children's diet of TV viewing has a positive effect on variables such as aggression toward peers and parents (a major childhood risk factor), and such reductions can be achieved by advice packages or school-community promotions.[99] Wyoming could promote the prescription of reduced TV viewing, using research-based interventions as a part of well-child clinics, because of the relationships of TV viewing and various developmental outcomes (obesity, for example). The same prescription might include some of the protocols embedded inside such programs as FAST (Families and Schools Together) to increase board games, puzzles, and all manner of activities that have been found inside of interventions to reduce the risk of substance abuse.[100]

Wyoming Recommendation:

The Department of Health will undertake a statewide campaign to reduce children's viewing of TV, using research findings on that subject while measuring the results of the campaign.

Developmental Transition and Summer Camps. The emergence of multi-problems predicting substance abuse is often preceded by failure of children to make some important developmental transitions such as moving from elementary to middle school, from 8th to 9th grade, for example. This idea was endorsed often in testimony. Some evidence suggests that a transition program might reduce these problems, and testimonials from youth are compelling. The author has witnesses the impact of such events like the "Champs Camp," run by people such as Michelle Karns, in which children who are fearful of the transition seem far more competent after the event.

Wyoming Recommendation:

The Wyoming Youth Sub-Cabinet ought to undertake an experimental test to determine the value of transition "camps."

Multi-Problem Youth

Some youth have much higher risk of engaging in serious substance abuse and antisocial behavior.[101] They are typically marked by more serious lifetime problems. For example, they may have had prenatal exposure to drugs, alcohol, and tobacco—predisposing them the more impulsive behaviors. They may have witnessed serious human violence, which tends to change the chemistry of the brain—resulting in much higher probability of engaging in early substance abuse. They often have serious problems in school. The famous study by Jessor and Jessor (1977) was the first to fully identify the phenomenon. Such youth often account for very large proportions of arrests and other acts of deviance in a community.

Wyoming has felt the impact of two such youth. The two boys who killed Mathew Sheppard are classic case studies of multi-problem youth. Henderson saw a murder-suicide of his parents, for example. McKinney had the marks of fetal alcohol effects. Both became heavily involved in methamphetamines. These two young men show how profoundly such cases can affect a whole community, state, or country. Can such multi-problem youth be helped, even in later adolescence, through powerful intervention strategies? The answer is clearly, yes.

Hill Walker and colleagues have profoundly demonstrated that such children can have their behaviors affected over a long period of time with simple but effective interventions used in school settings during the elementary years.

FIRST STEPS TO SUCCESS is a preschool or kindergarten program with well-controlled follow up research.[102] Multi-problem youth typically look like the kindergarteners before completing First Step—disruptive, impulsive, and non-compliant. Following First Step, most kindergartners are far more behaved and resilient.

CLASS, PASS, RECESS and PEERS are likewise very powerful procedures that have been shown to turn around highly deviant children in elementary school settings.[103] Typically, the interventions can be implemented over a couple of months with the assistance of a "coach" who helps transfer the control of the effort to the classroom teacher. The strategies are far more effective than standard counseling or mental-health interventions, yet they are rarely used because they are not well known.

PROJECT LIFT addresses parent-child management and children's skills for interacting with peers as risk factors for later problem behavior. The approach happens in elementary school. PROJECT LIFT also includes interventions designed to provide positive consequences for appropriate peer interactions on the playground (using a permutation of the Good Behavior Game), which helps children generalize the skills they learn in social skills training to real-life situations.

LIFT also teaches parents skills for improving their communication with their children.

LIFT has three-year follow-up data on fifth graders. Children who had been involved in the program had less association with deviant peers, lower likelihood of a first arrest, and less initiation of alcohol and marijuana use than did fifth graders not receiving the program.[104] Importantly, these effects were found regardless of the level of problem behavior initially exhibited by the children, implying that children most at risk to develop multiple behavior problems benefited as much as children with fewer risk factors. Fifth graders in control schools were 1.8 times more likely to be using alcohol, 1.5 times more likely to have tried marijuana, 2.4 times more likely to have been arrested than fifth graders who received LIFT.

The *YOUNG LADIES/ YOUNG GENTLEMEN CLUBS* (YLYG) targets youth in grades 1-6 who are identified by teachers and principals as at-risk for school failure and dropping out and who engage in problem behavior in the classroom. Students attend a group session, which can be led by volunteers from the community, several times per week throughout the year. The group is run by an adult who also serves as a mentor to the students and as a liaison between the student's family and the school (i.e., by conducting home visits). The group focuses on developing problem-solving and social skills, as well as on character education and discipline. Students learn how to respect and care for themselves, each other, and adults. Music therapy has proven to be a valuable factor in the program's success. YLYG, developed by the Partnership for a Safer Cleveland, has been in existence since the mid-1980s and has served as a model for similar programs in other school districts throughout the country.

YLYG has undergone several (albeit limited) evaluations.[105] In the most recent one-year longitudinal evaluation, children and teachers reported significant improvements in child social competence, and group leaders reported significant gains in child pro-social behavior accompanied by decreases in aggressive behavior. Analysis of grade card data found statistically significant improvements in positive classroom behaviors, self-control, and general attachment to school. Parents also reported program benefits. Why is this strategy reported here? One reasons is because it is a low-cost, low-tech strategy that could be widely implemented in Wyoming, and it has some reasonable scientific validity.

RECONNECTING YOUTH is a five-month, semester-long intervention program for secondary schools that integrates small-group work, life skills training models, and a peer-group support model. It includes 90 daily class lessons, typically 55 minutes per class, that teachers or youth leaders can use sequentially, selectively, or infused into other curricula. To enter the program, students must have fewer than the average number of credits earned for their grade level, have a high rate of absenteeism, and show a significant drop in grades. A youth may also enter the program if he or she has a record of dropping out or has been

referred as a significant dropout risk. In published studies, the program produced a 60% decline in hard drug use, 20% increase in average GPAs and attendance, and significant decreases in aggressive and suicidal behaviors.[106] Reconnecting Youth is presently being used in Laramie, and appears to have applicability to Wyoming conditions. The evaluator for the Wyoming-based effort is the Department of Psychology at the University of Wyoming, and has started to report some positive results.

Wyoming Recommendation:

The Department of Health, the Department of Family Services and the Department of Education will develop and promote the infrastructure for communities to use a series of practical, cost-effective school and community-based prevention strategies. Schools and communities will be free to seek other sources of funding for other strategies.

Clinical-Practice Interventions.

Not all children respond to prevention strategies. Some need higher doses of services, particularly if they are more seriously antisocial, depressed, anxious, or even users of mood-altering substances. The lack of response to the universal prevention strategy may strongly indicate the need for more intensive strategies. Several kinds of clinical interventions exist, such as solution focused and intensive protocols to prevent the migration to substance abuse and other multiple problems.

Solution Focused Protocols typically emerge from behavior analysis:

⇒ Behavior analysis protocols (e.g., Functional Assessments, effective behavioral support) are powerful research-based protocols that can help diagnose and treat disturbing behaviors, often exhibited by children who grow up to have serious, multiple problems.

⇒ Kazdin Model for Clinic Practice embraces many individual tools and procedures that can be used in the classroom or home settings to reduce problem behaviors related to risk and to increase protective behaviors. Each strategy has been tested in multiple contexts to show results. Teachers and staff can be taught the procedures in a modular way to build organizational and personal capacity.

Surprisingly, therapists, counselors, or teachers almost never know most of the highly effective, proven strategies. Some young people need very intensive interventions. Several well-researched candidates are mentioned here:

Functional Family Therapy or Multi-Systemic Therapy are both highly researched intensive protocols.

MULTI-SYSTEMIC THERAPY (MST) is an intensive family- and community-based treatment for youth exhibiting serious clinical problems including violence, substance abuse, and severe emotional disturbance (SED). MST targets the known correlates of antisocial behavior (i.e., individual, family, peer,

school, community), and it is highly operationalized.

MST therapists work in the youth's natural world (e.g., home, school, community); treat youth and their families for 4-6 months; target children at risk of out-of-home placement; provide services to meet the individual needs of each family members; and provide services that are culturally competent (i.e., based on the family's values, beliefs, culture). In addition, MST therapists carry low caseloads (2-6 families) and are available 24 hours per day, seven days a week and provide a comprehensive array of services to meet the multiple needs of each family.

MST has been evaluated in eight randomized control groups, involving more than 850 families.[107] These clinical trials have targeted violent and chronic juvenile offenders (three trials), substance abusing or dependent juvenile offenders (one trial), inner-city delinquents (one trial), juvenile sexual offenders (one trial), youths presenting in a psychiatric emergency (one trial), and maltreating families (one trial). One study of 118 substance-abusing and substance-dependent juvenile offenders (60% were poly-substance abusers), found that 72% of the young people also had one or more psychiatric diagnoses. In addition, substance-abusing and -dependent juveniles averaged 2.9 previous arrests, and 33% had at least one out-of-home placement. MST has consistently produced significant changes in ultimate outcomes: decreased adolescent drug use, decreased long-term rates of re-arrest (25%-70%), decreased self-reported criminal offending, and decreased days in out-of-home placements (47% to 65%). As reported by the Biglan study group, there are independent cost-benefit analyses of MST, indicating that $13.45 in savings or benefits accrued for every dollar spent on MST.

MST could be implemented in the denser counties of Wyoming, and there would have to be changes in Medicaid or contracting services to use this powerful protocol in our state.

FUNCTIONAL FAMILY THERAPY is a family treatment for delinquent teens that focuses principally on family communication, rules, and consequences as risk factors for delinquent behavior. The Biglan group has summarized the approach: "Trained therapists deliver the intervention weekly. Initially therapists meet with parents and the teen and assess the teen's difficulties and family members' responses. They then formulate a conceptualization of difficulties by looking particularly at patterns of interactions and hypothesizing whether each involved family member ultimately gets closeness from others, distance from the family, or some balance of these from his or her interactions with others. During this stage of treatment the therapist also works to reframe the problems in non-blaming ways to engage the family, reduce negativity and blaming, and decrease resistance to participating in family treatment. Then the therapist moves into developing here-and-now plans with the family to achieve the functions served by problem interactions and the teen's problem behavior in more adaptive ways, using strategies that may involve altering consequences for the problem(s),

negotiating alternative ways of structuring family life, and/or communicating in better ways with other family members."

FFT has a several good evaluations, thought not quite as many as MST. Recently, there was a randomized trial that compared FFT -- alone or in combination with individual cognitive behavior therapy – with a group intervention and with cognitive behavior therapy alone. Teens were referred for marijuana abuse. Results on marijuana use indicated that FFT and the combined intervention produced significant declines at 4 months after treatment began, but only the combined intervention maintained these changes at 7 months. Both FFT treatments, however, produced declines in the percentage of teens that changed from "heavy" to "minimal" use at both 4 and 7-month follow-ups. The treatment groups did not differ in their effects on parent reports of aggressive and disruptive behavior or on reports of family conflict; all groups declined significantly over time. The Biglan Group reports that FFT has similar cost saving as MST, but FFT does not have as strong of impact on serious behaviors as MST.

Dr. Robert Schwebel created the Seven Challenges approach as an "in-school treatment" program for substance abuse. It is one of the few research- based protocols for substance abuse treatment in a school setting. This program has had a randomized-control group study, which has not yet been published. Both NIDA and CSAP have expressed strong desire to replicate this approach, because of the dearth of any treatment programs in school.

Wyoming Recommendation:

The Departments of Health, Education, and Family Services shall undertake to develop an integrated delivery of research-based, solution-focused and intensive protocols for children and adolescents—designed to reduce the incidence of multi-problem behaviors inclusive of substance abuse.

Multi-Dimensional Treatment Foster Family Care is designed for adolescents who have shown a pattern of repeated juvenile offending. It targets various family and peer risk factors associated with the youth problem behaviors that are the focus of this book, including parental monitoring, providing consistent consequences for behavior, and reducing associations with deviant peers.[108] The intervention involves placing adolescents in the home of a foster parent who has been extensively trained in behavior management skills and who is continuously supported by intervention staff. Foster parents establish an individualized plan designed to reinforce desired self-management, academic, and social behaviors, and to limit the teen's contacts with deviant peers. Key features of the program include daily monitoring of the adolescent's behavior with consistent consequences for even minor rule infractions. Once the adolescent's behavior was under control, he or she was gradually returned to his or her home when possible. The biological parents received the same type of intensive behavior management training and support

from project staff that was provided to foster parents.

The approach has been tested in several high-quality evaluations, inclusive of randomized control-group studies with long-term results.[109] Overall youth placed in the foster-care program were incarcerated on 60% fewer days than boys in the alternative interventions. Moreover, they spent twice as much time living with their own parents or other relatives, after the program was completed. Analysis of juvenile court records showed that boys in foster family care had fewer misdemeanor and felony arrests. Moreover, they had fewer self-reported index crimes, felony assaults, and general delinquency. Eddy and Chamberlain (2000) provided evidence that the specific changes in the quality of adult care of the adolescent and the interdiction of associations with deviant peers were the effective ingredients leading to observed reductions in antisocial behavior.

According to the Biglan Group, unpublished analyses of effects on substance use indicated that after one year in the program, young people who received foster family care reported lower levels of "major" drug use and, after two years, less marijuana use. An independent analysis of the cost-benefit of this program was compared with the usual community placement. The special foster care program could provide $22.58 in benefits and savings for each dollar spent on it.

Wyoming Recommendation:

The multi-dimensional foster family care model needs to be adopted in Wyoming to help reduce our difficulties handling very high-risk young people, and it is wholly consistent with the recommended Accountabilities Act. The state regulations on Medicaid need to be amended to allow in-state psychologists, physicians, and others to receive payment for psychiatric and psychological services—which would greatly facilitate the implementation of such protocols as Multi-dimensional foster care, Multi-systemic therapy, or functional family therapy.

Standards for IEP, 504 and Child Study Teams

Many of the multi-problem youth who migrated to serious substance abuse first came to the attention of schools in the form of 504 Accommodation Plans, Child Study teams, or Individual Educational Plans (IEPs). It is evident from testimony, site visits, and examination of case reports that these events often lack substantial, effective procedures or grounding in any theory. For example, attention deficient hyperactivity disorder and oppositional defiant disorder are extremely common reasons for convening such meetings. Very often, there is no use of reliable screening tools, no consultation of appropriate tools and frequent recommendations that can and do make children worse. These problems are not

the "fault" of the participants; they are a "systems level" fault.

Each meeting needs to have access to:

⇒ Reliable tools to help participants to make some decisions.

⇒ Quick access to proven, research-based tools that can act as "first aid" to reduce the problems.

⇒ Guidelines for further action.

There are several reasons to develop such standards: 1) The state pays 100% of special education services, 2) poorly-constructed interventions can result in a quick and potentially dangerous *worsening* of symptoms, and 3) effective screening and strategies can dramatically improve the developmental pathways of the child.

Wyoming Recommendation:

The Department of Health, Education, and Family Services shall develop, promote, and distribute guidelines and simple research-based practices to support effective planning meetings regarding special education services.

Regional Child, Adolescent, and Adult Science-Based Practice Promotion Team

The chief author of this section has the opportunity to travel all around the country advising centers and entities on effective practices to reduce the problems of serious cases. In Wyoming, we don't have the infrastructure like most rural areas for learning or finding out about effective practices, especially for cases involving children and youth.

High- quality strategies, based in solid research, can literally make the difference between life and death. The treatment section of this proposal talks about a regional team based on the experience of Canada, our northern neighbor, who shares some of the issues of isolation and limited resources we have. We strongly recommend that regional teams be developed to provide the most effective prevention, intervention, and treatment strategies for child, adolescents, and adults in our state. The teams, once set up, could be funded in part from Medicaid. The teams need to recruit very skilled clinicians (MDs, Ph.D.s and other degrees), trainers, and community development specialists.

Wyoming Recommendation:

The Department of Health shall charter, develop, and regulate regional teams who support, train, advise public and private providers with the best level of clinical support, training, feedback on outcomes, and consultation as well as assist schools and communities implement effective prevention and intervention efforts to reduce substance abuse and related problems.

Medication Interventions

Medications can work to reduce the symptoms of problem behavior among very high-risk youth. Most laypersons believe prescription medications to be well studied for their effects. In many cases, studies on the use of medication are not as robust as some of the behavior interventions, but there is clear evidence that medications can be beneficial.[110] This document will not fully review the types of medications for prevention and intervention. That sort of document ought to be a separate report, which could be applied to various contracts or fees-for-service.

A couple of issues bear review, however. In the preparation of this report, we found **no** convincing evidence that the use of the stimulant medication methylphenidate *caused* substance abuse among children.[111] We did find evidence that such stimulant medications can be and, most certainly are, used by some for illegal purposes.[112]

Can we predict potential for abuse or possibility that individuals might migrate into abuse of the drug? Yes, thanks to advances of genetic technology. Brain dopamine D2 receptor levels, which show significant variability among people (polymorphs), predict reinforcing or unpleasant responses to psycho stimulants in humans.[113] Preliminary evidence suggests that D2 receptor levels predict response to psycho stimulants in humans and that low D2 receptors may contribute to psycho stimulant abuse by favoring pleasant response.

In everyday clinical practice, the prescription of mediations to treat problems related to substance abuse is often the result of marketing efforts, directly or indirectly, or experimentation until "something works." Most readers of this document are familiar with the various prime time TV spots for prescription drugs. There are several reasons for the state to be worried about the prescription of medications to treat behavioral disorders:

Emerging science shows that specific variations of genes interact with the effects of medications, perhaps making a drug dangerous, ineffective, or highly effective. This genetic variation almost certainly accounts for the "hit or miss" experience of prescribing or taking medications.[114] Certain genes regulate enzymes (e.g., P450 enzymes) affecting how medications interact (one drug makes you have serious side effects in the presence in another) and diffuse in the body. Whole web sites are now devoted to these interactions for psychiatrists and others (for example, http://www.mhc.com/Cytochromes/).[115]

⇒ One recent study summarizes some of the research on the powerful drugs used to treat the serious behavior problems:[116] It says:

> ***Anti-psychotic drugs are extensively metabolized by the cytochrome P450 (CYP) enzyme. Dispositions of a number of anti-psychotic drugs have been shown to co-segregate with polymorphism of CYP2D6. Metabolic drug-drug interactions have frequently been observed when anti-psychotics are co-administered with***

other drugs. Many anti-psychotic drugs are converted to active metabolites, which can contribute to the therapeutic or side effects of the parent drug. Information concerning the individual CYP isoenzymes involved in the metabolism of anti-psychotic drugs is important for the safe clinical use of this group of drugs

Ineffective medications can create serious danger for the patient or society, if the patient has homicidal or suicidal thoughts or behaviors. A patient may inflict harm to self or others, because the medication did not work. This problem is much larger than lay people might think, and has been documented that some children respond poorly to drugs like Ritalin based on their genetic makeup.117 Prescribing drugs that do not work can be an expensive trial and error.

Side effects may trigger suicidal or homicidal thoughts, actions, or mania. Some explanations are necessary for a casual reader. Many people, who are at risk for substance abuse, have or might evidence bipolar disorder in time. Other folks may carry a gene, but it has not fully expressed itself. Quite frequently, such folks present to a counselor or general practitioner as feeling depressed. A course of anti-depressants may be started, and the person becomes violent, hostile, criminal, or manic not long afterwards.aa The occurrence of mania during antidepressant treatment is a key issue in the clinical management. Could certain genes predict how people would respond to medications? The answer is yes.

The serotonin transporter (5-HTT) is the selective site of action of most pro-serotonergic compounds used to treat bipolar depression. The 5-HTT gene (SLC6A4) has 2 known polymorphisms. Recent research suggests that 5HTTLPR polymorphism may be an important predictor of abnormal response to medication in people with bipolar disorder.118

The issue of adverse side effects to medications like antidepressants is particularly important in a comprehensive plan for substance abuse treatment, prevention, and intervention. Substantial numbers of individuals who are diagnosed with bipolar disorder initially show only drug or alcohol abuse, sometimes years before the onset of bipolar disorder.119 Antidepressant medications are frequently proscribed for individuals with substance abuse or antisocial behavior, and this could "trigger" serious side effects for vulnerable individuals.

If the state has individuals (adults or minors) under its care (e.g., Medicaid, foster care, juvenile corrections, prison, etc.), these side effects present a risk for the state under standard torts actions or the Olmstead Ruling, should the state be involved in the selection, prescription, or dispensing of medications with psychotropic effects or side effects, which might induce danger behavior or even ineffective results. For this reason and elements of good clinical care, Wyoming ought to consider being the first state to use Buccal smears (swab inside the cheek) to assess gene and drug/treatment interactions as a part of its broad

[aa] Something of this nature actually happened in Wyoming capturing the national headlines after a man was prescribed a common antidepressant and killed several people, resulting in a very large lawsuit.

leadership. A separate document will be issued showing how this might happen in combination with the University of Wyoming and others.

Wyoming Recommendations:

The state needs to adopt an advanced scientific approach to the use of prescription medications, considering the state spends –over $66 million on prescription medications. Psychotropic mediations account for a larger percentage of such funds, and little is known by the general prescribing population about the issues associated with the prescriptions—except what is provided by the drug companies. Therefore, it is recommended that the state undertake the development of special programs for measuring the effectiveness of different drugs for high-risk youth and adults.

Parenting Strategies

Throughout the process of preparing the HB 83 report, individual after individual voiced a belief that "we need something to improve parenting skills" in Wyoming as a way of reducing our substance abuse problems. It turns out that there are ways to improve parenting skills, and some of them result in reduced substance use. Improving parenting skills in the state would take a serious commitment to applying some very fine science and practice on a large scale.

STRENGTHENING FAMILIES PROGRAM. Nearby, in Iowa, one of the best research and demonstration projects has been underway, showing how to improve parental competences and reduce substance abuse.[120] Kumpfer and colleagues developed Strengthening Families Program. It is designed to improve specific aspects of family functioning associated with adolescent problem behavior. Parents learn skills for making their expectations clear, using appropriate discipline practices, managing emotions, and communicating with their children. Videotapes illustrating the use of key skills are used to model parenting skills. Youth are taught skills that complement the skills parents are learning and are also taught skills for dealing with peer pressure and stress. In family sessions, parents and youth practice conflict resolution and communication skills and engage in activities designed to increase family cohesiveness. The program is provided in seven, weekly group sessions. In the first six sessions, parents and youth participate in separate one-hour skill-building sessions, which are followed by an hour long family session in which parents and young people practice the skills with each other. The seventh session consists of the one-hour family session alone.

A well-known national researcher conducted a randomized controlled trial in which 33 schools in small (8,5000 or fewer people) rural Iowa communities that were randomly assigned to receive the Strengthening Families Program, Preparing for the Drug Free Years, or no intervention. When students were in 10th grade, the researchers obtained follow-up data from 67.9% of the original sample. Adolescents whose families received the

Iowa Strengthening Families Program reported significantly less aggressive and destructive behavior in tenth grade than did the adolescents who had not been in the program. For example, 7.9% of young people in the control condition reported breaking into a building, while only 2% of the IFSP young people did so.

The researchers also examined the effects of Iowa Strengthening Families Project on substance use one and two years following the program. Effects of the program on substance use were not significant at one-year follow-up. However, by two-year follow-up they were. Whereas 30% of adolescents in the control condition initiated use of tobacco, alcohol, or other drugs between the year-one follow-up and the year-two follow-up, only 15% of the adolescents in the IFSP condition did so. The researchers also reported that scores on the Alcohol Initiation Index were significantly lower for IFSP adolescents than control adolescents at both one and two year post-treatment assessments. Moreover, the proportion of young people who initiated alcohol use was lower for the IFSP condition at both time points. Of particular interest is the number of young people who reported having been drunk. Among control youngsters, 19.1% reported having *ever* been drunk at two-year follow-up, while only 9.8% of the IFSP young people did so.

Thus, it is possible to run a parenting intervention in rural areas like Wyoming and achieve reductions in substance use and related multi-problems. Is it worth the money to do this type of effort? The Biglan Group has summarized the cost-effectiveness data specifically on the Iowa Strengthening Families Project.

> ***They [researchers] concluded that the accumulated lifetime costs of preventing a single case of alcohol use disorder were $121,878 (discounting future avoided costs by 3 percent per year). The resulting benefit-cost ratio was $9.78 per $1 invested. The net benefit per participating family was $6,039. This analysis does not include benefits associated with the effect the program has in lowering aggressive behavior.***

There are a few concerns, however, with the Iowa model. It appears that the more serious problem families may not have been reached—but the results were still helpful. Other models, also tested in a rural context, may offer a broader possibility of effectiveness using similar principles of parenting.

The TRIPLE P POSITIVE PARENTING PROGRAM is a multi-level system of parenting and family support strategies aimed to prevent behavioral, emotional, and developmental problems in children by enhancing the knowledge, skills, and confidence of parents. Triple P was developed and tested extensively by Dr. Matthew Sanders and colleagues at the University of Queensland in Australia, and is now being disseminated around the world.[121] Dr. Ron Prinz, who is an American professional with 25 years experience in prevention and treatment of childhood conduct and substance abuse problems, has recently launched the dissemination of Triple P in the United States.

Triple P is a system of behavioral family interventions based on social learning principles and developmental research on parenting and children. This approach to prevention and treatment of childhood and adolescent disruptive behavior problems has the strongest empirical support of any family-based preventive intervention with children, particularly for those at risk for conduct problems and substance abuse.[122] Triple P aims to enhance family protective factors and reduce risk factors associated with severe behavioral and emotional problems in childhood and adolescence. Specifically the programs aim to: enhance the knowledge, skills, confidence, self-sufficiency, and resourcefulness of parents; promote nurturing, safe, engaging, non-violent, and low conflict environments for children; and promote children's social, emotional, language, intellectual, and behavioral competencies through positive parenting practices.

The interventions used in Triple P have been subjected to a series of controlled evaluations over the course of more than 20 years. Several studies have established the effectiveness of Triple P in reducing or preventing children's disruptive behavior problems in a variety of populations and settings.[123] The evidence supports Triple P's approach, which is based on a broad, public health perspective on parenting and family interventions, which is clearly more cost effective than depending solely on deep-end clinical treatment of delinquency and substance abuse.[124] Consistent with a cost effective public health approach, Triple P aims to provide for any given family the minimally sufficient intervention needed to solve the issue at hand, and no more.

The system of Triple P is particularly attractive for states like Wyoming with major geographical constraints. Australia, where Triple P originated, has some of the same problems as Wyoming with respect to how the population is spread over large areas. Flexible delivery modalities are important to overcome this challenge. Triple P has several formats including telephone and self-directed versions. Practitioners delivering Triple P can make good use of Wyoming's excellent Internet capabilities to reach families in remote locations. Triple P also matches philosophical tenets such as individualism and self-sufficiency predominant in the Wyoming population. Core principles of Triple P include the promotion of self-sufficiency, empowerment, and personal agency in parents, as well as an emphasis on parent-directed goal setting.

Triple P has five levels on a tiered continuum of increasing strength designed to reach the entire population of parents.

Universal Triple P (Level 1)
Level 1 is a media-based parenting information campaign for all parents interested in information about parenting and promoting their children's development. The approach simultaneously promotes positive parenting strategies to all parents and publicizes the availability of Triple P programs throughout the state.

Primary Care Triple P (Levels 2 & 3)
Levels 2 and 3 are brief consultations with parents usually in primary care settings or other similar access points (e.g., daycare

centers, schools, community centers). These levels are for parents who have specific concerns about their children's behavior or development. Level 2 involves one or two 20-minute consultations (face-to-face or by telephone), while Level 3 involves four 20-minute consultations. Primary Care Triple P is supported by an extensive collection of parent-friendly Tip Sheets focusing on positive solutions to specific behavioral and developmental problems commonly experienced by children.

Standard Triple P (Level 4)
Level 4 is broadly focused training in parenting skills. This level is for parents wanting more intensive training in positive parenting skills and typically benefits parents of children with moderate to severe behavior problems. Level 4 has delivery formats including individual, group, and self-directed (with or without telephone assistance) variants. The telephone-assisted self-directed format is particularly useful in rural areas where families and practitioners are separated by long distances. In the individual format, parents participate in a 10-session program, while the group format involves four, weekly group sessions followed by four, weekly individual telephone follow-ups with each family.

Enhanced Triple P (Level 5)
Level 5 is typically delivered by trained professionals working directly with a family.

Families can enter the system at any level and move up or down in intensity depending upon their needs and preferences. Most families never get to or need Level 5. Many can be positively impacted with either the Level 1 media information or with a little bit more programming via Levels 2/3 — which may make Triple P the most cost effective parenting interventions.

The main Triple P programs focus on parents with children 2-12 years of age, but Triple P has now extended programming to parents of teens. Additionally, there are Triple P programs for special populations, such as Stepping Stones for parents of developmentally disabled children and Pathways for parents at risk of maltreating their children.

Another attractive feature of Triple P is that it is delivered by a wide variety of practitioners and professionals. Nurses, pediatricians, family and general physicians, daycare supervisors, and school counselors, as well as more traditional mental health providers can implement Primary Care Triple P and family services practitioners. Psychologists, social workers, marriage and family therapists, counselors, and school professionals typically implement standard Triple P. Psychologists, social workers, marriage and family therapists, and psychiatrists deliver enhanced Triple P.

To be effectively implemented as a preventive approach, the whole Triple P system needs to be operating in tandem. Primary Care Triple P, which would be put in place first, involves training for the largest contingent of practitioners and other professionals. Standard Triple P is next and provides programming for

parents who access Primary Care Triple P but need more (most parents don't). Enhanced Triple P, needed by the fewest families once the other levels are in place, would be established in traditional treatment settings. Finally, other variants of Triple P (Teen Triple P, Stepping Stones for parents of developmentally disabled children, and Pathways for parents at risk for maltreatment) would be implemented.

The National Institute on Drug Abuse suggests that Triple P model represents an advance, and it grew out of the conditions of few people and a large land area. An important facet of Triple P is population-based promotion via media and related activities. Triple P has already developed media materials and strategies, which can be adapted and integrated with other social marketing plans recommended in HB 83 for a comprehensive Wyoming plan.

Wyoming Recommendation:

The Departments of Health, Education, and Family Services should adopt the Triple P model as a system's level strategy for a cost-effective way to improve parent child behaviors in the causal chain of problem behaviors—including substance abuse.

Telephone Support

Most clinical research and support research is conducted in larger urban areas, where major universities abound. In many instances, the types of support interventions from such locations are not feasible in the rural context of the West. The authors looked for several cases of telephone-based interventions that might affect the course of disorders or risk factors related to substance abuse. We fortunately found some delightful ones. One was called, "Grandma Please."[125] It was an after-school help line, which uses elderly volunteers as telephone-assisted self-help.[126] While the intervention was not a huge intervention per se, we felt the nature of it would be useful in reducing risk factors for younger children and even pre-teens who lacked supervision.

Wyoming Recommendation:
We urge a replication and evaluation of, "Grandma Please."

Community campaigns, coalitions and readiness

Throughout the process of HB 83, we would hear from both professionals and citizens, "What can we do as a community? We know that government cannot do this alone." This is the pioneer spirit of Wyoming of a group of people coming together in common purpose, and the spirit of "we'd rather do it ourselves" in the West.

At one level, the movement toward "science- based practices" seems prickly toward community-based initiatives. "Science-based practices" sounds an awful lot like Big Brother, who has never been too popular in our part of the world. On the other hand, we are used to the idea of county extension agents and others giving us the best scope on "what works." We'd much rather place our bets on something with a greater likelihood of success.

Community coalitions are tricky in a place like Wyoming. The same folks pretty much get asked to serve on the coalition for this and that. We just don't have enough folks to fill all the jobs that have to be done. Thus, we face a serious question: "Should we put our time into something if it doesn't' pay off?" That's a valid question, because we've all had the experience of doing things with limited results.

It's timely in Wyoming to examine scientific literature on community campaigns, coalitions, and readiness. First, as a state, we participated in a major study on community readiness—the Tri-Ethnic Center Community Readiness study on efforts to tackle the methamphetamine problems. Second, the outcome of this report could well involve mobilizing communities into action around substance abuse treatment, intervention, prevention, and control

Can community campaigns work? The answer is yes, if well constructed, based on good theory, and yoked to sensible activities. The next few pages will detail some community efforts that have worked well in controlled research. Some information will also be covered about unsuccessful versions, so we can avoid drilling some dry holes.

Getting Parental Involvement. Some studies such as the successful Project Northland show that it is possible to engage families and even high-risk youth in a community-wide parenting intervention, involving the distribution of specially constructed booklets and homework.[127] Ary and colleagues have shown that specially constructed pamphlets can guide conversations between mothers and daughters.[128] A number of investigators have shown that specially constructed booklets or storybooks, sometimes coupled with community campaigns, possibly including videos, can alter parent-child interactions related to the development of protective factors and reduction of risk factors. As a prevention scientist, I have personally participated in community and even national trials where as much as 50% of the families participated in the prevention activities, which were solidly based on prior experiments showing the activity had benefit. The community promotion model has applicability to Wyoming, provided some key lessons are observed:

⇒ Families (both child and adults) are depicted as heroes in doing something for themselves and for the greater good. Typically, both youth and adults have active roles in the effort, not just passive roles.

⇒ The activities are concrete and produce some kind of clear benefit. Awareness only activities are not terribly effective, nor are over-focused on the problem.

⇒ The community members involved in the campaign have clear roles and actions to undertake, but they are not required to move mountains or reinvent the wheel.

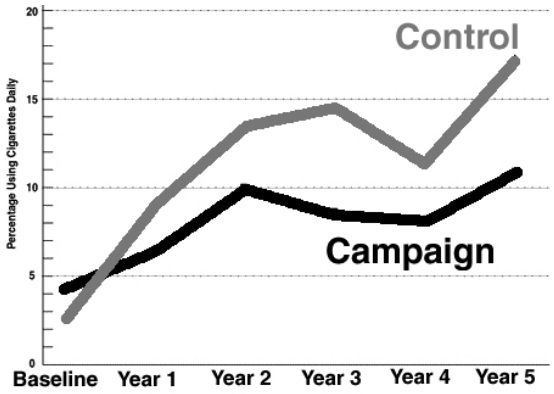
⇒ Activities and actions link and overlap across different venues—home, school, clubs, businesses, etc. This creates a synergy and sense of common action. It is also just plain good marketing.

⇒ Community members are not expected to "come up with all the solutions."

⇒ Media involvement is integral to the overall effort, not an add-on. Often the media involvement is focused on attending an event or participating

Mary Ann Pentz gave an invited address for the National Institute on Drug Abuse, concluding:[129] A review of multiple studies suggests that a community prevention program can vary in the use of mass media, parent programs, community education and organization, and

Figure 35: Midwestern Prevention Program effects on unadjusted cross-sectional prevalence rates of daily cigarette use in Kansas City as an example



local policy change. Results suggest that community-plus-school programs may yield greater effects on the more serious levels of drug use (e.g., on daily smoking compared with monthly smoking), effects on parents as well as youth, and perhaps more durable effects than are currently obtainable from most school programs alone. Overall, the magnitude of effects on smoking and substance use appears slightly greater for school-plus-community versus school programs alone (6- to 8-percent net reductions).

Some of the most extensive community-based efforts have focused on alcohol use. We think these Community Prevention Trials have considerable application for Wyoming, especially because they address issues of perceived access.[130]

Community Prevention Trial was an effort undertaken by the Prevention Research Center, in Berkeley, California, to reduce alcohol-involved accidental injuries and death through a five-year comprehensive program of community awareness and alcohol policy activities in three communities.

The project implemented and evaluated five community-based components. The project used an environmental policy approach to prevention and implemented five mutually reinforcing components:

(1) community mobilization to develop communication organization and support,

(2) responsible beverage service to establish standards for servers and owners/managers of on-premise alcohol outlets to reduce their risk of having intoxicated and/or underage customers in bars and restaurants,

(3) a drinking and driving component to increase local drunk driving enforcement efficiency and to increase the actual and perceived risk that drinking drivers would be detected,

(4) an underage drinking component to reduce retail availability of alcohol to minors, and

(5) an alcohol access component to use local zoning powers and other municipal controls of outlet numbers and density to reduce availability of alcohol.

Why Focus on Alcohol in Communities?

Car crashes are the leading cause of death for young people under 25, and underage drinkers are involved in alcohol-related crashes in a higher proportion than their proportion of the driving population. Nearly 70% of young adult (aged 20-24) deaths in traffic crashes involve alcohol.

Holder et al. (in press). Evaluation Design For A Community Prevention Trial: An Environmental Approach To Reduce Alcohol-Involved Trauma

1. COMMUNITY MOBILIZATION embraced community knowledge, values, and mobilization. It involved working with existing community coalitions and task forces to prepare for implementation of specific alcohol problem prevention; to develop public awareness focusing on alcohol-involved trauma and the relationship of drinking impairment, increased risk of death or injury; and to increase awareness of the individual component activities. Local news media and public information activities were used to support the overall goals of the project as well as those of individual components. Project organizers worked with existing community coalitions to implement specific alcohol problem prevention activities and to develop a public awareness and concern about alcohol-involved trauma and the increased risk of death or injury associated with drinking. Public communication via media advocacy supported the overall goals of the project as well as those of individual components

2. RESPONSIBLE BEVERAGE SERVICE assisted alcohol beverage servers and retailers in developing and implementing beverage service policies to reduce the likelihood of customers becoming intoxicated or driving when intoxicated, and to eliminate service to underage customers.

3. UNDERAGE DRINKING included community programs focusing on reducing sales and access to alcohol by minors, training off-premise alcohol retailers to prevent sale of alcoholic beverages to minors, and increased efforts to enforce underage sales laws.

4. RISK OF DRINKING AND DRIVING increased the actual and perceived risk of apprehension while driving under the influence of alcohol. This component also increased DWI efficiency through training enforcement officers in new techniques for identifying DWI drivers, and the use of passive alcohol sensors to increase the probability of detection. This component also provides an environment which empowers significant others and retail establishments to intervene in order to prevent drunk driving.

5. ACCESS TO ALCOHOL involves the use of local zoning powers and other municipal control of outlet density to reduce the availability of alcohol, which is related to alcohol-involved trauma.

What are the results of the Community Prevention Trials model? The positive results being reported are useful for the Wyoming context.[131]

There was a significant reduction in alcohol sales to minors. Figure 39, below, shows the overall effects of Community

Trials on the percentage of off-premise outlets selling alcohol to apparent underage buyers. Overall, off-premise outlets in experimental communities were half as likely to sell alcohol to minors as in the comparison sites. This was the joint result of special training of clerks and managers to conduct age identification checks, the development of effective off-premise outlet policies, and, especially, the threat of enforcement of lawsuits against sales to minors. A reduction in sales to minors is an important finding, because of role of perceived access in the Wyoming specific model of predicting youth substance abuse.

Table 4: Percentage of Premises Selling Alcohol to Minors

Experimental vs. Comparison Communities			
	All Communities		
	Comparison	Experimental (Enforcement with no training)	Experimental (Training only)
Pre (1995)	47%	53%	45%
Post (1996)	35%	19%	16%

As a result of community training in techniques for working with local news media, there was a statistically significant increase in coverage of alcohol issues in local newspapers and on local TV in the experimental communities over their matched comparison communities. An analysis found that there was a statistically significant effect on local newspaper coverage of alcohol issues in the experimental but not in the comparison communities and this could be attributed to the media advocacy activities of the project. This is an important finding for Wyoming, because it suggests that community norms can be affected by a community coalition.

Demonstration communities increased adoption of responsible alcohol serving policies over the comparison communities. This can be seen in the table above. This is particularly important in the Wyoming context, where bars are a mainstay of small community life, and they may be able to affect alcohol use by pregnant women.[bb] Pre- and post-test results of reports by bar and restaurant managers found that the experimental communities showed greater evidence of policy adoption than the comparison communities. There were limited but promising results in reducing alcohol service to heavy-drinking patrons, which may become more potent subsequent evaluations.

Early findings show that the project reduced alcohol-involved traffic crashes. A statistically significant reduction in such

[bb] Most people think programs for reducing alcohol use by pregnant women need to focus only on the women. This is appears not true based on focus groups. Women are often afraid of the impact of not drinking on relationships with men. The work by Holder and others suggests that the community context might be affected.

crashes was found overall, comparing experimental communities with their matched comparison communities. The introduction of special and highly visible drink and drive enforcement—with new equipment and special training—produced the significant reduction. The table above shows the results. These results bear heart-wrenching value for Wyoming, because of our high rates of traffic crashes involving alcohol. In a number of state meetings we heard plainly painful stories from families who lost loved ones to such crashes, and they begged for action in our state. The Community Prevention Trials data show that we can give a gift of life.

What is the cost-effectiveness of the Community Prevention Trials? The answer to that question is first tempered by the fact that scientists have only recently studied the cost-effectiveness issues of prevention in general. We reproduce here the comments of Dr. Harold Holder, the originator of the community trials project. He wraps all of the costs into his estimates:

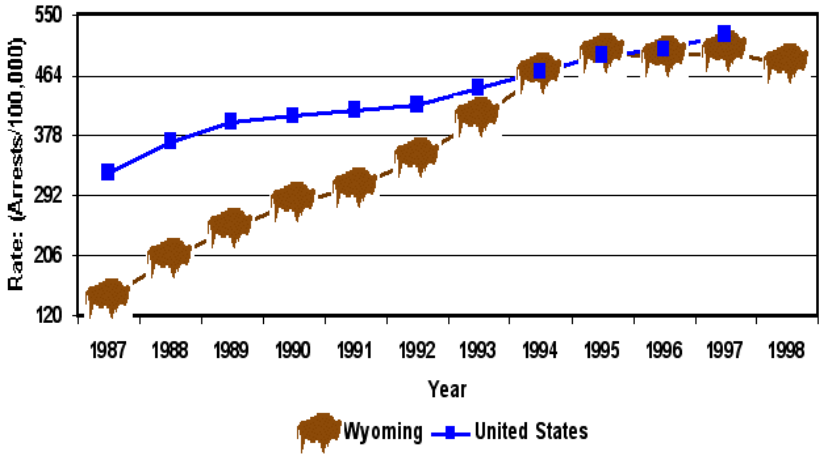
> ***As an example of the potential cost effectiveness of such a policy-based community trial, the following illustration is provided. Approximately $90,000 U.S. each year was the cost of local prevention staff in each of the three experimental communities [which had about 100,000 people each]. A replication project would need three to four years in one local community at a cost of between $270,000 to $360,000 U.S. in total. In the Community Trials Project, the local community staff cost over four years was a total of $1,080,000 U.S. ($360,000 U.S. times three experimental communities). This included the staff cost for local implementation of all components. At this time, the distal effects of only the drinking and driving component are known, because of its early implementation. Across all communities over the first four years of the project, the net reduction in alcohol-involved traffic crashes was 78 crashes (Vows* et al.*, 1997).***
>
> ***If one uses an average cost of $39,905 U.S. per crash (an estimate based upon medical, legal, and insurance costs as well as lost wages during rehabilitation but not lost productive years due to early death), then the savings from just these 78 fewer alcohol-involved traffic crashes in the three experimental communities relative to their matched comparison communities was $3,112,590 U.S. ($39,905 U.S. per crash times 78 crashes).***
>
> ***It should be carefully noted that this is a simplistic cost effectiveness analysis…***
>
> ***If we subtract the cost of the intervention across all three communities (noting that this implementation cost includes the costs of the other prevention components whose effects are not yet accounted for), then we get a net total savings of $2,032,590 U.S. Thus, every U.S. dollar invested in this Community Trials Project returns $2.88 U.S. in savings, just from reduced traffic crashes alone. Again,***

this is a very simple example of cost effectiveness analysis. A more complete analysis would require more complex adjustments and calculations.

Since the 1998 paper discussed above, Dr. Holder and his colleagues have produced more results. Specifically, the trial presented clear evidence that environmental changes can reduce alcohol-involved traffic crashes and other acute trauma. There was a 13% decline in amounts consumed per drinking occasion, a 58% decline in driving when having had too much to drink, and a 64% decline in driving when over the legal limit in the intervention communities relative to the comparison communities. These changes produced a 10% reduction in nighttime injury crashes and a 6% reduction in crashes in which the driver had been drinking. Across the three intervention communities, the savings from the interventions were 56 nighttime injuries and 67 driving after drinking crashes per 100,000 adult population per year. A 43% reduction in assaults directly observed in emergency departments (EDs) between two matched sites, and a 2% reduction in all ED assault cases observed using hospital discharge records between all matched sites, were obtained (a reduction of 68 assault cases per 100,000 adult population per year between the two matched sites).

Are these results relevant to Wyoming? Absolutely. What is particularly useful is the additional finding about reductions in assaults, which have been rapidly rising in Wyoming and which are highly related to the prediction of long-term substance abuse and arrests involving incarceration. The figure below shows the rise in assaults in Wyoming over time,

Figure 36: All Assaults in Wyoming Compared to the US



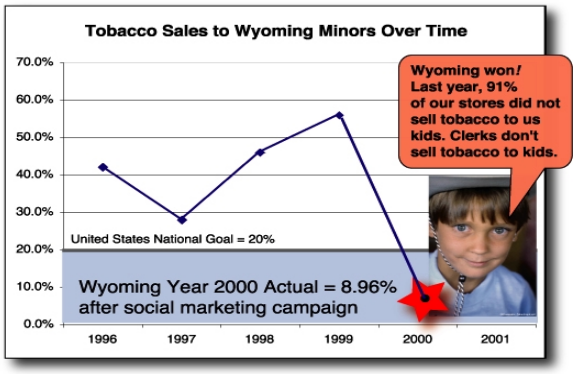
which has risen substantially. We did not used to be a state where people intentionally sought to hurt one another, compared to the rest of the country.

Wyoming is the prime state to apply the spectacular results of the Community Prevention Trials. The First Lady, Mrs. Geringer, has taken a strong lead on underage drinking with the First Ladies' Initiative, and will be a keynote speaker at that national meeting of the Governors' Spouses event.

Wyoming Recommendation:

The Department of Health shall develop and implement a work plan to integrate the successful models of community campaigns and mobilizations for tobacco, alcohol, and other drugs for a field test in Wyoming using appropriate scientific controls.

Sales Clerks Campaigns to Reduce Availability

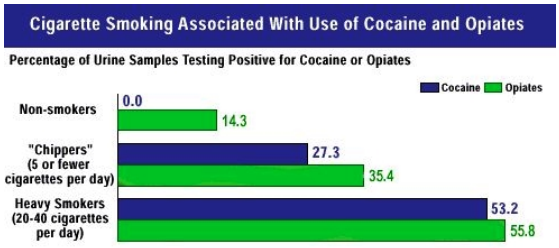


Historically, Wyoming has had high rates of sales to minors of tobacco. This issue accounts for our own pattern of substance abuse, based on the analysis of Wyoming specific data. In 2000, Wyoming became the first state to apply the Reward and Reminder campaign to reducing tobacco sales to minors. The results were spectacular, as shown in figure below. Wyoming recorded the largest single drop in tobacco sales to minors ever reported by a state.

Figure 37: Tobacco Sales to Minors in Wyoming

Wyoming must continue and support its national leadership in applying the best science to reducing access to tobacco by minors. Why is this important to our state? Emerging research is showing that early tobacco use somehow "wires" or "primes" the brain for terrible drugs like cocaine and meth, which are epidemic among our young people, compared to other states. The figure below is from the National Institute on Drug Abuse, showing the links between tobacco and cocaine.

Figure 38: Tobacco use and cocaine use



Wyoming Recommendation:

The Department of Health shall expand and continue the Reward and Reminder campaign for tobacco under the auspices of the Tobacco Use Prevention Blueprint and test the application of the same strategies for alcohol.

Alternative Education

Various studies and testimony by citizens suggest that students in alternative education bear a substantially elevated risk for substance abuse. Paradoxically, most such sites do not provide services to help such students cease or reduce their use of addictive substances. For example, one recent study indicated that 90.7% of the adolescents in alternative school met the criteria of drug abusers, or chemically dependent or had a deferred diagnosis due to defensiveness.[132] About 1/3 of the alternative sample of alternative students may be poly-drug users.[133] It will be

necessary for Wyoming to construct and evaluate an alternative education model that reduces multi-problem behavior inclusive of substance abuse, since there is very little solid science on effective practice.[134] A good place to begin with a model for Wyoming is to use the work of Dr. Denise Gottfredsen, who has written on the subject and actually conducted relevant research.[135] She has also participated in the Wyoming Think Tank. Our interviews during the process of HB 83 make it clear that this population ought to be a high priority group, though they are relatively small in numbers. Some evidence suggests that young people in alternative settings in rural areas are different from their normative peers in the need for high sensation seeking, which would clearly argue against attempting a "get tough" approach.[136]

Wyoming Recommendation:

The Departments of Health, Education, and Family Services shall collaborate on testing an intervention designed at alternative school youth to reduce their involvement in multi-problem behaviors. The effort shall use acceptable standards of experimental or quasi-experimental designs.

Pregnant Mothers

It has been well established that reducing the use of alcohol, tobacco, and drugs has profound, positive consequence for children and society. Wyoming's extremely high rate of use of ATOD by women during pregnancy begs for urgent

intervention.

The prospects of building residential treatment for so many Wyoming women who are using alcohol, tobacco, and drugs during pregnancy is daunting in the long-term, let alone the short term. There is likely to be a sense that we cannot do much about the problem. In the preparation of this report, the authors reviewed the scientific progress on the issue of pregnant mothers' use of substances and the idea of harm reduction as an urgent public safety and health model. We found evidence to support the idea of some low-intensive, high-value harm-reduction strategies in the scientific literature that could be applied immediately.

Brief Doctor's Office Interventions. A recent article reported 48-month follow-

up data from a sub-analysis of a trial for early alcohol treatment (Project TrEAT) focused on women of childbearing age.[137] Project TrEAT was conducted in the offices of 64 primary care, community-based physicians from 10 Wisconsin counties. Of 5979 female patients ages 18 to 40, who were screened for problem drinking, 205 were randomized into an experimental group (n = 103) or control group (n = 102). The intervention consisted of two 15 min., physician-delivered counseling visits that included advice, education, and contracting by using a scripted workbook. A total of 174 subjects (85%) completed the 48-month follow-up procedures. At baseline, no significant differences were found between the experimental and control groups for alcohol use, age, socioeconomic status, smoking, depression or anxiety, conduct disorder, lifetime drug use, or health care utilization. The experimental intervention however produced a significant treatment effect in reducing both 7-day alcohol use and binge drinking episodes over the 48 month follow-up period. Women in the experimental group who became pregnant during the follow-up period had the most dramatic decreases in alcohol use. A logistic regression model based on a 20% or greater reduction in drinking found an odds ratio of 1.93 in the sample exposed to physician intervention. This trial provides the first direct evidence that brief intervention is associated with sustained reductions in alcohol consumption by women of childbearing age. The results have enormous implications for the Wyoming health care system.

Outpatient Treatment. Neonatal outcome is significantly improved for infants born to substance abusers who receive outpatient, substance abuse treatment concurrent with prenatal care compared with infants born to substance abusers who enter treatment postpartum.[138]

The small number of outcome studies suggests that success (as measured by abstinence) is associated with retention. Retention is facilitated by the provision of support services, such as childcare, parenting classes, and vocational training. There is no clear empirical basis for concluding that one type of treatment (for example, residential treatment) is more effective than another for helping pregnant mothers who are abusing substances.[139]

Wyoming Recommendation:

The Department of Health should rapidly undertake a series of trials to test different models' efforts to reduce substance abuse during pregnancy, which would take a harm-reduction orientation.

Adult Role Modeling Intervention to reduce Alcohol Use by Teens

Wyoming, like many states, has specific issues of adults acting in adverse ways, modeling or directly supporting substance use by teens. One of the pernicious ways adults harm teens is by giving teens tobacco, alcohol, or drugs. Many adults do not see anything wrong or against Wyoming norms in giving teens tobacco or alcohol. Indeed, we heard testimony from both teens and adults in

communities that some adults see no harm, possibly even benefits, by giving teens alcohol or tobacco—often under the misguided view that this teaches "responsible" use. We can find no data to support this idea, and we find compelling arguments against the idea:

⇒ Emerging research from the National Institute on Drug Abuse shows that the child or adolescent brain is more vulnerable to both tobacco and alcohol, which was not scientifically known before.

⇒ Perceived accessibility is an extremely powerful predictor in Wyoming of substance abuse by teens (not just youthful testing the limits). Much of that perceived access to alcohol and tobacco, based on testimony from Wyoming youth and young adults.

Wyoming Recommendation:

The Department of Health, acting in collaboration with other public-private partners, needs to undertake a public campaign to change the behavior of young adults and adults providing substances to kids.

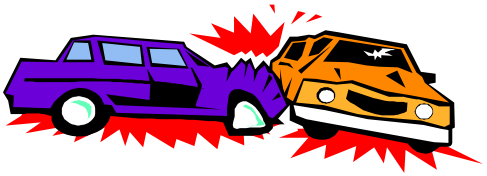
⇒ Some long-term follow-up intervention studies have been conducted showing it is possible to reduce youth access to tobacco, alcohol, and other drugs through interventions aimed at adults as role models in the community —parents, young adults, etc.[140] This strategy is a necessary component of our Wyoming prevention. Part of our social marketing campaign promotes two key concepts:

- "In Wyoming, we don't sell tobacco or alcohol to our kids."
- "In Wyoming, we don't give tobacco or alcohol to our kids."

Both adults and youth were adamant in their testimony. This type of effort to curb adults providing tobacco and alcohol cannot be a simple flyer, but must be deeply embedded in virtually every public event in Wyoming such as Frontier Days, University of Wyoming athletic events, rodeos, county fairs, and much more. Additionally, many witnesses brought up points that are well documented in the scientific literature:

⇒ Drive-up windows for liquor and tobacco are essentially freeway entrance ramps for youth access involving young adults and others who purchase for minors. There are no recorded homicides, vehicular fatalities, serious crimes against persons or property or other threats to public health and safety as a result of requiring that adults exit their cars in order to purchase alcohol and tobacco. There are Wyoming cases of youth who did all of these things as a result of purchases of illegal products from drive-up windows. As a part of a comprehensive strategy to reduce the serious public safety and health repercussions of alcohol, tobacco, and other drugs in Wyoming, the simple act of closing the drive-up liquor windows will help.[141] Data from the experience in New Mexico suggests that such action will assist the public safety of Wyoming.

⇒ Reducing the blood level alcohol of adults to .08 has now been pretty convincingly shown to reduce adult traffic fatalities and possibly alcohol use disorders.[142] The impact of the .08 BAC can be seen below. Related to .08 BAC is the presumption of a ZERO BAC (functionally cannot be measured reliably below .02 presently) among underage drivers. We suggest that special interventions be designed, tested, and refined for drivers who are below age 21 to participate in a mandatory protocol if apprehended while driving or riding in a car (with a underage driver who is using) with any measurable level of blood alcohol. This recommendation is based on the fact that a recent review of the effectiveness of low blood alcohol concentration laws on younger drivers shows that a focus on zero BAC in minors versus .04 to .06% BAC in



minors results in an average reduction of 17% fewer fatalities versus 7% fatality reduction.[143] This process could well enhance the key predictor variable of causing other youth to put positive peer pressure on each other NOT to use, which has been found to be a key predictor in Wyoming adolescents as a protective factor against substance abuse (not just youthful experimentation).

Lowering the legal per se blood alcohol limits has strong benefits if the following conditions are met, based on internationally studies:[144]

⇒ Strong and continued public education campaign.

⇒ Focus on general deterrence with vigorous enforcement.

Screening in Multiple Contexts

The harm from substance abuse can be reduced via standardized screening processes. Medical services, emergency rooms, physician's office, dental offices, and other community settings can occasion interventions for children, teens, and adults.

David Lewis, Professor of Medicine and Community Health, Brown University, insists alcohol screening must become routine, in all medical settings:

> ***Routinely means that everybody should be screened for alcohol and other substance problems. In fact, I would say that it's a vital sign, just like the other vital signs that are taken…Making screenings part of the vitals signs normalizes it. We'll take your blood pressure, we're going to check your blood sugar, and we're going to ask you how much alcohol you use. It's a health effect. It's not a moral issue; you're not a bad person. We're concerned about your health and people who use medication, people we have to treat with antibiotics or painkillers, we need to be concerned with their alcohol or drug use for health reasons. It's nice to re-conceptualize***

> ***drinking** [or other drug use]◊ **as a medical vital sign issue.***

Dr. Lewis is also Project Director, Physician Leadership on National Drug Policy. He says physicians must become leaders and advocates in this public health crisis:

> "We need more routine screening and intervention. We need a major expansion of the treatment system. There is absolutely no question in my mind that one of the hallmarks of quality of care is going to be clinical preventive services and that's going to include routine screening and intervention for alcohol, tobacco, and other drug problems in all primary care settings."

A recent publication in the American Family Physician summarizes some key reasons to support alcohol and other drug screening as standard[145] in Wyoming.

> ***Preventive efforts on the part of family physicians are important because: (1) alcohol-related problems are prevalent in patients who visit family practices; (2) heavy alcohol use contributes to many serious health and social problems; and (3) physicians can successfully influence drinking behaviors. In the United States, the one-year prevalence of alcohol-use disorders, including alcohol abuse and alcohol dependence, is about 7.4 percent in the adult population. In patients who visit family practices, the prevalence is higher. One study of 17 primary care practices found a 16.5 percent prevalence of "problem drinkers, and another study found a 19.9 percent prevalence of alcohol-use disorders among male patients.***

We recommend that the Department of Health, Department of Family Services, and Workforce Development promulgate policies and procedures for screening of drugs, alcohol, and tobacco. Further, we recommend that the Department of Health issue guidelines for the reimbursement to licensed health or mental health professionals for screening services under Medicaid, coupled with guidelines and support for brief interventions and others delivered in doctor's or by doctor's offices or affiliates for early intervention and cessation efforts.

Screening for substance use or abuse is not just an adult issue. It is clearly a child and adolescent issue. In consistent testimony, it was clear that young people were using drugs, alcohol, and tobacco without any adult recognition or intervention well before their use exploded into life-derailing events. The entire process of HB 83 is to build up the structure for both treatment and intervention services. The earlier young people, who have difficulties with use of tobacco, alcohol, and other drugs, get some cessation or early intervention services, the better their prognosis and that of the public's safety and health.

Therefore, it is recommended that the Legislature instruct the Department of Health, the Department of Education, and the Department of Family Services to develop and promulgate screening

◊ Added to clarify intent from other comments.

procedures with defensible scientific validity and prescriptive utility for alcohol, tobacco, and other drug risks, prevention, intervention, and treatment for children and youth in the following contexts:

⇒ Medicaid payments for well-child visits and consultation on child behavior problems.

⇒ 504 and Individualized Education Plans (IEPs) under the auspices of the IDEA legislation.

⇒ Referrals for counseling or psychiatric services within school settings.

⇒ Child protective situations.

⇒ Situations in which medical professionals suspect that a mother may have been using alcohol, tobacco, and/or other drugs during pregnancy.

Wyoming Recommendation:

The various departments of the state need to adopt standardized practices of screening for substance abuse and/or the problems that predict substance abuse, and couple such screening with brief, motivational interventions when possible.

Adult Mental Health Issues

Various mental illnesses elevate risk of substance abuse in adults and children under the care of such adults. By preventing the mental illness or reducing its severity or early intervention, there are reasons to believe substance abuse, misuse, and use can be reduced. Generally speaking, most people believe such mental health interventions or prevention strategies necessarily involve the use of a licensed professional. That is not necessarily the case, and a variety of findings have positive implications for Wyoming in the context of the HB 83 mandate.

Low-Cost Depression Interventions

Depression among mothers of minor children elevates the risk three times that the children will develop lifetime substance abuse or conduct disorders.[146] The symptoms of depression can be relieved by reading and applying lessons from special constructed books (bibliotherapeutic books), which have been well tested in some randomized control group studies. The effect sizes of bibliotherapy interventions are as high as +.5, with no difference between therapist-administered treatments.[147] One meta-analysis review reports bibliotherapy to be as beneficial as group or individual therapy.[148] One study compared different books for older adults,[149] *Feeling Good—The New Mood Therapy*, which is based on a cognitive model, with the book *Control Your Depression*, which is based on a behavioral model.[150] Positive clinical results held true for both books over two years, compared to a control group. The positive impact of the general adult population also held up over a three-year study.[151] The books tested have been well grounded in theory, and represent a very inexpensive way to reduce the prevalence rates of depression symptoms—about $100 per case including a professional and the purchase price of a book. While these books might not work for everyone,

widespread use of them in Wyoming could save the state money and provide an open door to treatment without the use of pharmaceuticals or intensive interventions if used by physicals, workforce development agencies, and other community settings.

Low cost interventions exist for other disorders related to migration to substance abuse or serious health consequences:[152]

⇒ Reduction of Anxiety Disorders using self-help or minimal help strategies from scientific research.

⇒ Cessation of Smoking using self-help coupled with minimal help or nicotine replacement therapy.

⇒ Motivational Interventions to change behavior using simple strategies tested in doctor's offices.

Wyoming Recommendation:

We recommend that the Department of Health undertake the promotion of these low-cost interventions as a part of the comprehensive strategy for substance abuse reduction. These strategies will require some issues of policy and regulations, as well as direct funding of the simple procedures themselves (e.g., buying volume copies of the materials, payment of one-day shipping to identified clients, etc.).

Is Prevention Just an Issue of Money?

Some have alleged that *"we just need to* spend more money on prevention, and that EVERY dollar spent on prevention returns $7.00 in results." As an old song lyric says, "It ain't necessarily so."[cc]

Consider the example from the Centers for Substance Abuse Prevention (CSAP), which has pumped some $9 million dollars in prevention money into 27 states using a particular model of giving out 85% of the funds to local communities. According to officials at CSAP, these grants have

[cc] This figure has become a near mantra in prevention documents, funding appeals and testimony before governmental entities. The data derive from some very specific science-based programs with long-term follow up, not from prevention expenditures or programs of any nature. It is the equivalent of saying every dollar spent on an auto mechanic saves you seven dollars in the future. As most adults know from personal experience with cars, some mechanics are not so good and some cars should be sold off or junked.

typically not produced significant reductions substance use, misuse, or abuse in the recipient states.

DARE is another example, having received over a billion dollars in federal funding, not counting funds from state governments, drug seizure, and local funds. Multiple, carefully controlled studies have typically revealed very weak or no effects on prevention. One meta-analysis conducted by the highly-regarded Research Triangle Institute, for example, reports:[153] The DARE effect size for drug use behavior ranged from .00 to .11 across the 8 studies; the weighted mean for drug use across studies was .06. For all outcomes considered, the DARE effect size means were substantially smaller than those of programs emphasizing social and general competencies and using interactive teaching strategies. DARE's short-term effectiveness for reducing or preventing drug use behavior is small and is less than for interactive prevention programs.

Why might these and some other examples of high-infusion of dollars fail to prevent substance abuse in any cost-effective way? There are many reasons, a few of which follow:

⇒ The theory of substance abuse may have been dead wrong (e.g., "low self-esteem causes drug use.") or weak will (e.g. perceived health consequences).

⇒ Implementation and follow through may have been mostly lip service (now well documented in some studies).

⇒ The organizational design for training, support, and other logistics may have been inappropriate.

⇒ The wrong kids got the wrong intervention (e.g., a prevention program aimed at stopping kids from even trying drugs is singularly ineffective if not hazardous for kids who are already using tobacco, alcohol, or other drugs; they need cessation approaches and reduced access).

The development of a Wyoming specific plan to reduce substance abuse must make use of these cautions.